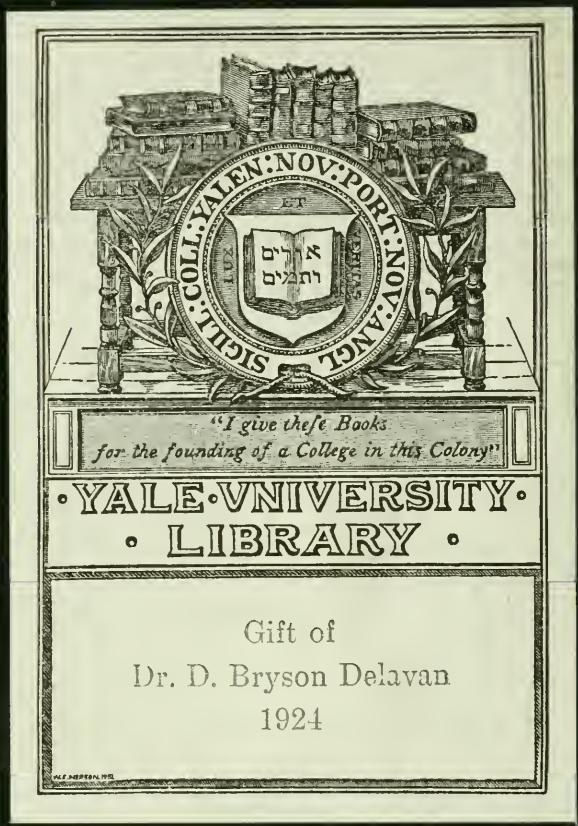
RD662
892 J

Cancer of the Mouth Tongue and Œsophagus

F. Bowreman Jessett



TRANSFERRED TO
YALE MEDICAL LIBRARY

CANCER OF THE MOUTH, TONGUE, AND ŒSOPHAGUS:

THEIR

PATHOLOGY, SYMPTOMS, DIAGNOSIS,

AND

TREATMENT.

BY

FREDERIC BOWREMAN JESSETT, F.R.C.S., Eng.,

Surgeon to the Cancer Hospital, Brompton.

WITH NUMEROUS ILLUSTRATIONS.

LONDON:
BAILLIÈRE, TINDALL, & COX,
KING WILLIAM STREET.

1892.

CONTENTS.

Page

INTRODUCTION vii

CHAPTER I.

Cancer of the Lips 1

CHAPTER II.

Cancer of the Gums and Antrum 22

CHAPTER III.

Cancer of the Jaws 30

CHAPTER IV.

Cancer of the Tongue 65

CHAPTER V.

Cancer of the Tonsil 138

CHAPTER VI.

Cancer of the Pharynx and Œsophagus 141

INDEX 179

Digitized by the Internet Archive
in 2012 with funding from
Open Knowledge Commons and Yale University, Cushing/Whitney Medical Library

http://www.archive.org/details/cancerofmouthton00jess

CANCER OF THE MOUTH, TONGUE, AND ŒSOPHAGUS.

CHAPTER I.

CANCER OF THE LIPS.

THE form of cancer that is invariably found in the lips is *squamous-celled epithelioma*. With exception of the uterus and tongue, the lips are more frequently attacked with the disease than any other part of the body; thus, out of 860 cases of epithelial cancer occurring at the Cancer Hospital, the lips were the seat of the disease in 160 cases, or at the rate of 18·6 per cent., the tongue in 190 cases, and the uterus in 222.

The following Table demonstrates in what proportion the disease attacks different parts of the body:—

Lips	160
Tongue	190
Mouth	17
Face	97
Trachea and larynx	4
Uterus	222
Labia and vagina	52
Rectum	26
Penis and scrotum	23
Ear	2
Other parts of the body	67
Total	860

Cancer in the lips is often the result of cracks or fissures, and in such cases the importance of an early diagnosis cannot be over-estimated, as it is only by recognizing this terrible disease in its early stage that a satisfactory result can be insured by treatment.

The lower lip is attacked very much more frequently than the upper; thus, out of the 160 cases which I have collected, in 140 the disease was situated in the lower lip, in 5 the upper, and in 15 cases both lips were the seat of the disease; so that in only 1 in every 28 cases, or 3·57 per cent., was the upper lip affected by itself, and 1 in 7 cases, or 10·7 per cent., was it affected at all, and the majority of these were from the extension of the disease from the lower lip at the angle of the mouth.

Sex plays a very important part, as out of the 160 cases referred to only 3 occurred in women.

Origin.—Although cancer of the lip often commences as a crack or fissure, it far more frequently has its origin as a warty growth or tubercle, which gradually ulcerates like the ordinary form of tubercular lupus. In neither case, however, is the suspicion of the patient or his friends aroused to the importance of these ulcerating spots, and it is only when the ulceration extends, and shows no signs of healing, or the warty growths increase in size so as to cause some inconvenience, that medical advice is sought.

Age.—This form of cancer, like scirrhus, is essentially a disease which attacks persons who have passed middle life; thus, out of 860 cases above referred to, 249 were above 60 years of age, 253 between 50 and 60, and 223 between 40 and 50 years of age, 725 being thus over 40 years.

By comparing my figures with those collected by Sir James Paget, it will be seen how closely his experience coincides with my own:—

	20–30.	30–40.	40–50.	50–60.	Over 60.	Total.
Sir J. Paget	9	22	40	32	40	143
The Author	31	104	223	253	249	860

The average age at which persons are most liable to be attacked by epithelioma, as shown by the above Table, is therefore 51·9 years.

It is most essential, then, to bear in mind this important fact, that age plays a no insignificant part in aiding us to come to a correct diagnosis of a suspicious-looking ulcer on the lip, in which we may have grave doubts as to its true character. At any rate, we may deduce from the above Tables, and likewise from Tables drawn up by Mr. Morrant Baker in the Med. Chir. Transactions, that the conditions favourable to the production of epithelial cancers regularly increase with the increase of age, especially of the lips and integuments of the face.

Hereditary Predisposition.—Among the 860 cases collected by me there was distinct family history of cancer in 24, or at the rate of only 2·8 per cent. of the whole number. In many of these cases, however, there was no mention of any family history at all, and probably the question had not been thoroughly inquired into, and therefore the statistics in this respect are not satisfactory. Since I have been making special inquiries into this point, I have met with a great many cases in which there has been a distinct history of cancer in some member of the family of the patient. A most interesting and instructive case came under my notice at the latter end of last year. It was the case of a man aged 61 years, who presented himself with a large ulcerated epithelial cancer occupying the right half of his lower lip, extending along the mucous membrane of the cheek and gums of the same side. The glands of the neck and submaxilla were extensively diseased. His case was too far advanced to allow of any operative measures being had recourse to, and he died about three months after I first saw him, the disease having rapidly extended and eaten away the whole of his cheek and fauces. His family history was as follows: His father had cancer of the penis, which was amputated, and he

died of secondary deposits in his liver at the age of 63 years. His uncle (father's brother) had cancer of the tongue, which was removed, and he died of secondary growths at the age of 63. The aunt (father's sister) had cancer of the breast, which was amputated, and she died of secondary growths at the age of 65. His mother died of cancer of the uterus.

In this case, from the situation of the cancer from which his father and uncle died, there can be no doubt that they both suffered from epithelial cancer, while the probability is that his aunt suffered from scirrhus. The importance of this cannot be overlooked, as I think it tends to prove that a person may suffer from one form of cancer, while his relatives may have suffered from another form; thus, Sir James Paget states that, out of 160 instances, the following cases were found: (1) a man had medullary cancer of his toe; his father had cancer of the lip; (2) a woman had repeated epithelial cancer of the labia; her sister, her father's sister, and her mother's brother's daughter had cancer of the breast; (3) a man had epithelial cancer of the lip, whose grandmother had cancer of the breast; (4) a gentleman had epithelial cancer of the interior of the cheek; his aunt died with cancer of the breast; (5) a woman had medullary cancer of the breast; her mother had cancer of the uterus, and her uncle cancer of the face; (6) a woman had scirrhous cancer of the lip, whose mother's uncle had cancer of the lip; (7) of another woman who had a similar cancer, one cousin had cancer of the lip, another cousin had cancer of the uterus; (8) a third woman had scirrhous cancer of the breast, whose grandfather had cancer of the lip; (9) Dr. Warren mentions a case where the grandfather died of cancer of the lip; his son and two daughters died with cancer of the breast; one of his grandsons and one granddaughter had also cancer of the breast.

A case recently communicated to me by my friend Dr. Dabbs, of Shanklin, also illustrates this. He writes: "A widower, clergyman, residing with his own two maiden sisters

(retired from all work on a competency), suddenly lost all that competency and his sisters' capital also. Within a year and two months all these were dead, the clergyman of a malignant nasal growth, one sister of cancer of the breast, and the other of cancer of the stomach."

Such cases as these could be easily multiplied if necessary; but I think sufficient has been recorded to show, notwithstanding the small percentage of cases in which a family history could be traced, that heredity must have some influence in the development of cancer. As Sir James Paget points out, these facts may justly be regarded as evidence for the close affinity between epithelial and other cancers, and as an illustration of the modification which the cancerous and other functions may undergo in their hereditary transmission. I think it may even go further, and demonstrate that, although children of persons suffering from epithelial or other cancer need not themselves contract cancer, yet there is a certain dyscrasia of the blood transmitted from parent to offspring which is very likely to develop itself in one way or the other as cancer upon some very slight provocation; in fact, that such an offspring is more likely to develop cancer than a person with healthy parents.

Injuries.—A very large majority of men suffering from epithelial cancer of the lip are great smokers, and many will give a distinct history of some injury to the lip being caused either by the jagged end of a pipe scratching it, or the hot end of the pipe burning it, the sore being often constantly irritated by the persistence of the use of the pipe. Again, often the disease commences as a small wart or pimple, which the patient is constantly rubbing or picking, so keeping up a constant source of irritation: such a state of things often goes on for months, and even years, without any notice being taken of it, until at last the ulcer or warty growth may rapidly increase in size, and the sufferer then, when too late, seeks advice.

The diagnosis of epithelial cancer of the lip is not such a simple matter as at first sight it may appear, and I recommend you in all cases to be extremely cautious how you give a decided opinion upon the character of a warty growth, sore, or tubercle with indurated base. Many cases have come under my notice that at first sight had all the appearance of a malignant growth, but which, after a close examination into the history of the case, proved to be a chancre, or a sore of syphilitic origin. The sore in both cases may have identically similar appearances, the lip thickened, the base of the sore hardened and indurated, and yet the one will speedily disappear by appropriate treatment, while, in the other, treatment has no effect whatever upon the ulcer.* In both cases the submaxillary glands may be enlarged and painful. The chancre, however, upon inquiry, will be found to be only of a few weeks' growth, before which, the patient will tell you, his lips were perfectly free from any ulceration or induration; the glands in the submaxillary region become affected at a much earlier date than in cancer.

The age of the patient would also considerably aid in the diagnosis, as cancer, as I have already shown, is essentially a disease of advanced or advancing life, and is exceedingly rarely met with before the age of 30, and very much more commonly after 50 or 60 years; whereas chançres are most commonly met with in persons under the age of 30 or 40, and is found as often in one lip as the other, while cancer almost universally attacks the lower lip only. After from four to six weeks, should the sore be syphilitic, and have been allowed to extend without appropriate treatment, secondary symptoms will succeed, which

* In a case that came under my notice only the other day, a man had a large ulcerated mass, implicating nearly the whole of the lower lip, the base was hard and indurated, the edges everted, and it was diagnosed to be epithelial cancer of the lip, so far advanced as to be almost beyond surgical interference; the man, however, was admitted into the hospital, and treated with large doses of iodide of potassium, with the result that the ulcer speedily healed, and the induration disappeared.

of course at once decides its nature, and then, by large doses of iodide of potassium, or a mild mercurial treatment, the ulcer will speedily heal.

An epithelial ulcer of the lip, when once it has ulcerated, never heals; it scabs over, and, on removing the scab or crust, the sore will be seen gradually increasing in size. The edges are jagged, and somewhat everted; this, as the disease progresses, is very much more marked. The base of the sore is hard, and the tissues around indurated. The glands are affected comparatively early. Whether, in all cases where the glands are enlarged, they are infiltrated with the disease is, I think, open to doubt; yet the chances are such that it is never wise to leave an enlarged gland behind, as it may at any moment take up fresh and active action. A case of a man aged 63, who was under my care not very long ago, had an epithelial growth on his lower lip circumscribed and slightly ulcerated. He had one gland enlarged the size of a nut in the submaxillary region. I removed the growth, and he made a good and speedy recovery. I left the gland, thinking it might be enlarged merely by sympathetic irritation. After the operation the gland decreased in size, but remained about the size of a small French bean. I kept this man under observation for some weeks after his discharge from the hospital, and the gland not increasing in size, he was told to report himself from time to time. He did not turn up for nearly two months, and when he did he had caught cold, he said, and the gland was much more enlarged. I examined him, and found not only that the gland had very much increased in size, but that some of the cervical glands had also become implicated; the disease rapidly increased, and he died a few months later.

From this case one learns how insidious the disease is, and how necessary it is in all cases to remove any glands that may be in the least enlarged at the time of the operation.

The diagnosis of cancer from ordinary cracks and fissures is easy, as the latter almost invariably attack young and delicate

people, while cancer is a disease essentially of advancing years.

Cracks and fissures in the lips are usually met with in children and young persons, in the middle or near to the centre of the lower lip; they do not as a rule extend deeper than the mucous membrane, and are generally accounted for by some gastric derangement coupled with cold. These fissures are often excessively painful, and bleed freely if their edges are separated.

They usually yield to appropriate treatment, such as the application of nitrate of silver locally, and the internal administration of an alterative, followed by cod-liver oil and steel in debilitated strumous children, or some little stomachic and tonic in others.

While these cracks and fissures are of very little importance in early life, after the period of childhood, or in adults, they must be regarded with extreme caution and suspicion, as they are often the result of syphilitic or tuberculous poisons, and, moreover, may, if neglected, be the precursor of cancer or epithelioma of the lip. If due to syphilitic taint, the history of the case will in most cases enable the surgeon to arrive at a correct diagnosis. When an anti-syphilitic treatment, viz., large doses of iodide of potassium, are given, the ulcers heal.

Cancer of the lip is always of the squamous-epithelial type; I have never met with a case of scirrhus, neither is any such recorded in the case-books of the Cancer Hospital.

Dissemination.—Secondary deposits are never, or at any rate excessively rarely, met with in other organs or parts of the body in this disease.

Treatment.—The treatment of cancer of the lip must be based upon the best method of destroying or removing the disease: this can be done in some cases by caustics, such as chloride of zinc or arsenical paste, but in most cases recourse must be had to removal of the disease by the knife. I have no hesitation in

saying that, in my opinion, the use of caustics is never, or very rarely, to be recommended. They are far more painful than the knife, not nearly so certain in their action, and may, and probably would, be required to be applied again and again. I would therefore in no case, excepting the patient absolutely declined the use of the knife, recommend the application of caustics for the removal of this disease.

One often sees patients who present themselves with epithelial sores on their lips, on which they have, either of their own accord or by the advice of the medical man they have consulted, applied blue-stone or nitrate of silver; this form of treatment cannot be too severely condemned, as it increases the irritation, is very painful, and often causes a rapid increase in the size of the ulcer, to say nothing of the wasting of most valuable time.

If caustics are to be used, therefore, no half-measures must be adopted. There are various kinds of caustics in use; that most in favour at the Cancer Hospital is the arsenical paste made thus:—

℞ Acid arsenious.
Pulv. acaciæ, āā.
Aquæ, q. s. ut ft. mucilage.

This paste is painted tolerably thickly over the sore, and a small piece of lint applied, extending to about a line beyond the ulcer, and allowed to dry on. The caustic quickly attacks the diseased tissues, and sets up considerable inflammation; a bread-and-water poultice is then applied, and a deep slough speedily becomes detached. If the raw surface is not considered to be healthy, another application of the paste is recommended.

The Vienna paste is a great favourite with many; it is the "potassa cum calce" of the Pharmacopœia. It should be applied to the ulcer for from ten to twenty minutes, and followed by a poultice. Landolf's caustic is as follows:—

Bromin. chlorid.	....	....	.... 3 parts.
Zinci	....	....	.... 2 parts.
Antimon.	....	....	.... 1 part.
Pul. rad. glycyrrh.	....	....	.... 1 part.

Fell's caustic, another which at one time promised to have a considerable reputation, and which now is in use by a few empirics, is composed thus:—

℞	Pulv. rad. sanguinariæ Canaden.	....	℥ss vel ℥j.
	Zinci chlorid.	....	....	℥ij „ ℥ss.
	Aquæ	....	....	.... ℥ij.

A thick paste is formed.

Dr. Mackey, of Edinburgh, has used a caustic composed of—

Hydrarg. bichlor.	....	....	.... ℥iv.
Glycerine....	....	....	.... ℥xxx.

Ft. mucilage.

This makes a paste, which is allowed to remain in contact with the part for four hours; to be followed by warm water dressing. The slough separates in from three to six days.

Early and free excision should always, where practicable, be adopted, even if the submaxillary glands should be affected; in this case, however, it would be advisable to remove any glands that were found to be enlarged.

Should, however, it be found impossible to remove the whole of the disease by operation, the surgeon is not justified in attempting any such mode of treatment.

Numberless cases, unfortunately, present themselves which are entirely beyond our skill to remove. Something, however, may be done for these to mitigate suffering. The patient's strength must be maintained as far as possible by good, nourishing diet. Medicines can do little or nothing excepting there be much pain, when opium or morphia should be administered freely. Of local treatment, strict cleanliness, constantly irri-

gating the ulcerated parts with weak antiseptic solutions, and afterwards dusting them over with iodoform, tends much to the patient's comfort. A good lotion is formed by mixing the glycerine of carbolic acid with sulphite of soda and water, and either painting over the part with a camel's-hair brush or using an atomiser.

℞	Glycerine acid. carbol.	℥ss.
	Glycerine	℥ss.
	Sodæ sulphitis	℥j.
	Aquæ rosæ	℥x fl.

This solution, in some hands, is extolled as not only affording much relief from pain, but also it is said to possess a marked influence in retarding the progress of the disease. It has also been administered internally in teaspoonful doses.

The tinct. hydrastes Canadensis, of the strength of 1 drachm to 8 ounces of water, has been recommended by Dr. Edwin Payne as having a power of keeping the surface of the ulcer in a more healthy, and less offensive, condition.

Chloride of zinc in solution is a very favourite preparation with many. It certainly has a great power of arresting phagedenic action. Great caution is required in the use of this salt, as it is a powerful cauterant, a stimulant, an antiseptic, and an alterative. Dr. Zuerine, of Vienna, relates a case of cancerous ulceration of the septum nasi which threatened to destroy the whole nose; 1½ grain of the chloride of zinc, he says, were dissolved in an ounce of distilled water; the scab being removed, the sore was pencilled over several times a-day with the solution. At the end of a fortnight a healthy granulating surface was formed underneath the thick crust which covered the sore, and this being occasionally removed, and the solution reapplied, it cicatrized in five weeks.

A paste of one part of chloride of zinc with three of flour, moistened with water, has been used in extensive cancerous

diseases, and the salt given internally with apparent benefit; but I have not seen any good results accrue from this treatment; neither do I think, if the patient be so bad as to negative operative measures, are we justified in using these powerful caustics to endeavour to remove the disease.

It is not uncommon for erysipelas to supervene in some of these cases of epithelioma of the lip. The best treatment is to paint the whole surface over with tincture of iodine, tincture of perchloride of iron, or the following solution of perchloride of iron and quinine:—

℞ Tinct. ferri perchlorid. .... ℥j.
Quinæ disulph. .... ℥j.
Tinct. cinch. .... ℥ij to ℥ss.
To be brushed over the part every hour.

Internally the tinct. ferri perchlor. and quin. should be administered freely.

Pathological Specimen.—In University College Hospital Museum are two specimens, Nos. 1007 and 1008, where the disease has extended from the lip to the symphysis and body of the lower jaw, together with the soft parts of chin, in which Mr. Christopher Heath removed the whole of the diseased parts; but, as will be seen by the description and report of the cases, not with very happy results.

"1007. Part of a lower jaw, including the symphysis and the body on either side for about an inch, together with the soft parts forming the chin and middle of the lower lip, the whole being removed for epitheliomatous disease. The morbid growth has invaded the entire thickness of the soft parts, and is intimately adherent to the bone; its upper part is deeply ulcerated, the edges of the ulcerated portion being sinuous and slightly raised and rounded: in the situation marked by the piece of coloured glass, the substance of the lip has been completely perforated.

"From a man, æt. 58, admitted under Mr. Heath's care, May 17, 1876. About eighteen months previously the patient noticed a small crack on the inner side of the lower lip, which, after increasing, healed up, a firm

swelling having, however, by this time formed in its situation. In July 1875 the patient went into the Maidstone Infirmary, where the diseased parts were removed ; in three weeks the wound was healed, and he left. About December a fissure reappeared in the same spot, after exposure to cold, a morbid growth subsequently appearing on either side of the fissure, which then commenced to enlarge, and the growths at the same time increasing.

"The patient was in the habit of smoking a clay pipe, holding it to the left corner of the mouth, where he first noticed the fissure.

"No history of any similar disease in the family.

"The parts shown were removed in the following manner :—A vertical incision was made on each side of the growth from the lower lip to the point of the chin, the lower ends of these incisions being united by a transverse one. The upper half of the jaw, and with it the lip and morbid growth, were then removed with a small saw. The section not having been made beyond the whole of the disease, the skin was dissected from the bone and tumour remaining to the lowest point of the chin, and the middle portion of the lower jaw sawn vertically through on each side; the digastric, genio-hyoid, and genio-hyo-glossus muscles were divided with scissors, and the remaining portion of the disease removed. The parts were brought together by means of hare-lip pins, and the tongue securely drawn forward. The patient was attacked with bronchitis, and, in addition, the wound was affected, on the tenth day after the operation, with erysipelas, and the patient died on the following day."

"1008. The soft parts forming the chin, together with the lower part of the body of the jaw, for about its middle three inches, the whole being removed for recurrent epitheliomatous disease. The morbid growth forms a prominent oval mass measuring about four inches from side to side, and closely surrounding the lower border of the jaw ; on the left side a portion of the bone has been replaced by nodules of tumour-substance ; the tumour projects posteriorly, so as to fill the concavity of the jaw for a distance of nearly two inches. The skin is almost everywhere intimately united to the substance of the tumour, and is in places raised in round and oval swellings by extensions of the growth ; in these situations the integuments are smooth, thinned, and apparently infiltrated. In two or three places ulceration has spread very deeply into the main substance of the morbid growth, which is extensively hollowed, and beyond this into the parts beneath the floor of the mouth. The tumour is composed of an opaque, firmish, homogeneous substance, intersected by scanty lines of bright fibrous tissue.

"From a man, æt. 55, a fisherman ; admitted under Mr. Heath's care, November 1875. Four years before admission the patient noticed that

'the skin came off' the left corner of the lower lip, causing some pain; the sore healed, reappeared, and again healed, this happening several times. The ulcer subsequently reappearing, extended, and on each of its sides a swelling grew, which, after a time, ulcerated as the original surface.

"In February 1872, about twelve months after the first appearance of the disease, the patient went into the Monmouth Hospital, where the growth was removed by a V-shaped incision, the wound healing in a week.

"About twelve months before admission into University College Hospital, a small swelling appeared under the front of the lower jaw on the left side, at first not painful, but becoming so in its growth. About four months before admission the morbid growth commenced to ulcerate, the ulceration appearing in several spots at the same time.

"The diseased mass was removed by making an incision round it to the bone, which was then sawn through in the same plane. The mouth was not opened, nor the alveolar border of the jaw injured. The extensive surface resulting was left to heal by granulation. Cicatrization was not complete when the patient left the hospital, December 23, 1875. The disease returned soon afterwards, and ended fatally in a few months."

Operations.—It having been decided to remove the growth by means of the knife, the patient should be put under the influence of an anæsthetic, and placed in the recumbent position. Any broken or carious teeth that may tend to irritate the lip should be removed, as well as any collection of tartar that may be present.

Some operators, for small operations, prefer having the patient seated in a high-backed armed chair, and tied securely in, but I can see no advantage in this, and infinitely prefer having my patient on the table.

The lip on either side of the disease should be firmly compressed between the thumb and forefinger of an assistant; the surgeon then, seizing the ulcer with a pair of artery forceps, and putting the lip on the stretch, makes a free incision at least an eighth of an inch from the ulcer on one side, continuing downwards and inclined towards the centre of the ulcer, so as to finish the incision about half-an-inch below and opposite its centre; he then, putting the lip on the stretch in the opposite

direction, makes a similar incision extending to the end of the first, and thus removing the ulcer in a V-shaped piece. The cut edges should then be brought together by means of two or three hare-lip pins and thick silk twisted over them in the ordinary way. There is no occasion to tie any vessels as a rule, as the pressure of the pins is sufficient to arrest all hæmorrhage. Great care should be taken to insure the careful adjustment of the margin of the prælabium. A fine catgut suture through the mucous membrane here is often of advantage. Some surgeons prefer bringing the edges together with interrupted wire sutures.

It is always a good plan to oil the pins and silk with carbolic oil before introducing them, as it prevents the silk from sticking quite so firmly, and causes less pain when removing the pins. A narrow piece of lint, soaked in carbolic oil, should then be twisted round the pins, and a four-tail bandage, with a hole cut in the centre for the chin, applied.

Modifications of this operation are often requisite to meet the requirements of different cases, and much must be left to the ingenuity of the operator.

In cases where the disease extends very deeply, and possibly the whole or the greater part of the lower lip is affected, some form of plastic operation must be performed. In a case that came under my care a short time since the disease extended from the angle of the mouth, slightly implicating the upper lip to half-an-inch on the opposite side of the middle line; it also implicated fully three-quarters of an inch of depth of the lip. To remove this without at the same time performing some plastic operation would have been to leave the patient in nearly as bad a plight as I found him. He had also an enlarged gland under the maxilla. I cut a V piece of paper corresponding to the incisions I intended to make for the removal of the disease (Fig. I), and, fixing the apex of the triangle, twisted it round so that it should be exactly at right angles with the first. I marked

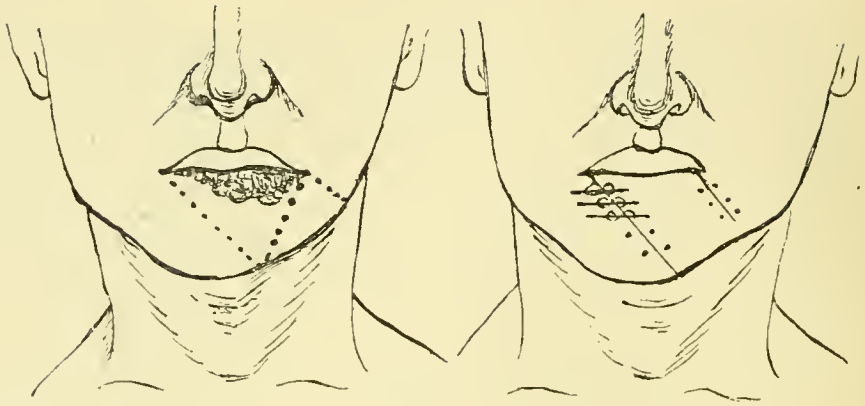


Fig. I.

this out with ink, and then proceeded to remove the growth. In this case, as there was pretty free hæmorrhage, I ligatured the coronary vessels, and then made my other incision, extending it well over the diseased gland, which I removed, and, dissecting up the flap, twisted it round so that it fitted accurately the cut surface of the lip, and fastened it there with stout silver-wire sutures; by loosening the integument under the jaw I was enabled easily to bring the loose flap up and unite it to the other cut surface.

This man made an excellent recovery, and had a very good mouth. He died six months after the operation from secondary deposit in the cervical lymphatic glands.

When the whole of the lower lip is affected, and it is thought desirable to remove the disease, the operation described

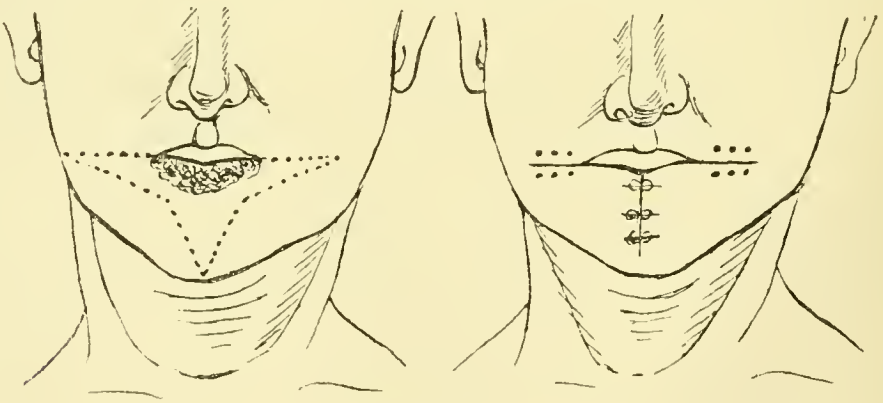


Fig. II.

by Mr. Erichsen is an excellent method, and yields good results. His plan (Fig. II) is a modification of that proposed by Serres. The object of the operation is to raise the lower lip to a level with the incisor teeth. An incision, about three-quarters of an inch in length, is made directly outwards from the angle of the mouth on each side, into the cheek; from the extremity of this a cut is carried obliquely downwards on to the upper margin of the lower lip, so as to excise the included triangular piece. The lower lip is then dissected away from the jaw from the inside of the mouth, and a V-shaped piece is taken out of its centre. By means of hare-lip pins on each side and a few points of suture, the incisions in the angle of the mouth are brought together accurately, and in the same way the vertical one in the centre is united. In this manner the whole of the lower lip is raised and brought more forward. Care should be taken in removing the cancer from the edge of the lip to leave the mucous membrane rather long (which may be always done, as the skin is affected to a greater extent than it); a good præ-labium is thus formed, and the restoration effected with but little deformity. Care must be taken to prevent union from occurring between the inside of the lower lip and the gum, by the interposition of a strip of oiled lint.

Buchanan, of Glasgow, as far back as 1841, published an account of a method for restoring the lower lip when affected by extensive cancerous disease, which leaves most satisfactory results.

The diseased part of the lip is first removed by a free sweep of the knife. An incision, B C, is then carried downwards and outwards on each side of the chin, and another incision, C D, upwards and outwards, parallel to and corresponding in length to A B. The flaps formed by these incisions are represented in Fig. III. They are detached from their subjacent connection, and the whole is raised upwards, so that the original elliptical incision curves into a horizontal line, and is made to constitute

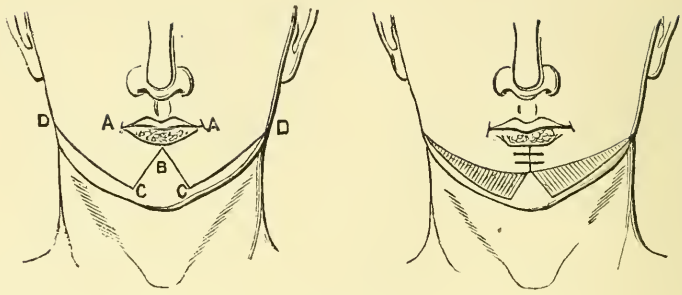


Fig. III.

the margin of a new lip, the secondary incisions under the jaw coming together in a vertical direction, in which they are retained by pins with twisted and interrupted sutures.

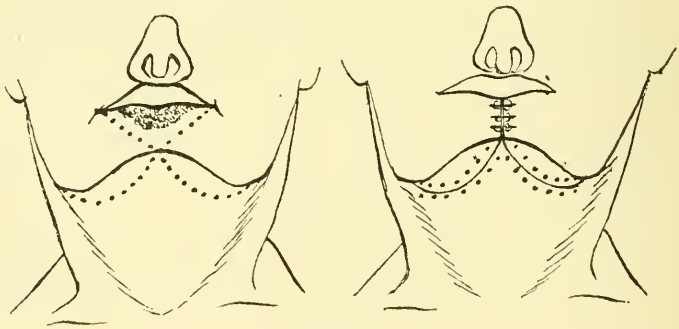


Fig. IV.

Professor Syme has practised, and recommends, the adoption of an operation somewhat different from any yet described (Fig. IV). He sweeps the whole of the diseased portion of the lip off with a semicircular incision extending from the angle of the mouth on the one side to that of the other; he then, from the centre of this incision, makes two other elliptical incisions extending downwards and backwards to the angle of the jaw

on both sides. The flaps so formed are dissected freely up, and brought together in the middle line, the portion of skin which is left at the chin serving to keep the flaps in position and prevent them slipping down. This operation gives very excellent results. Two cases at the Cancer Hospital, under my care, have been operated upon by this method recently, and the results have been most satisfactory.

In all these plastic operations of the lip it is well to stitch the mucous membrane and skin of the free border of the new lip together; this heals very quickly, and saves the patient much pain and discomfort.

There are cases sometimes in which the ulcers are very superficial, and in which it is needless to remove a V piece of the lip, which of necessity must considerably decrease the calibre of the mouth. In these cases I content myself with slicing off the ulcer, being careful, however, to keep sufficiently far from it; I then stitch the mucous membrane carefully to the skin. A case came under my care only a short time since in which a considerable part of the lip, some inch in extent, was eroded, and evidently the seat of epithelioma. In this case I adopted the method mentioned above, with most happy results.

Sometimes, although very rarely, the upper lip is the seat of most extensive disease, which may necessitate removal of the whole of the diseased part. In these cases a really good lip may be secured from the cheeks. An incision is to be carried upwards and outwards on either side of the nose to midway between the alæ and orbit; another incision is then made from the end of the last, extending parallel to the orbit as far outwards as the malar bone; these flaps being dissected up and brought down, the edges of the first incisions are to be united in the middle line (Fig. V). Excellent results may be obtained by this operation.

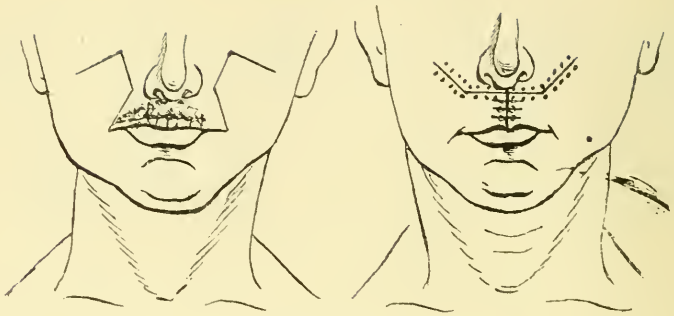


Fig. V.

Dieffenbach suggested, and practised, making two flaps, the inner incision extending from the angle of the mouth to midway between the alæ nasi and orbit on each side ; then another incision extending from the extremity of, and at right angles to, this incision, outwards to the depth necessary for the lip. A third incision is carried from the extremity of this last downward and parallel to the first, as low as midway between a line drawn from the alæ nasi above and the angle of the mouth below. These flaps are dissected up and twisted over, and the ends united with hare-lip pins in the middle line, the edges of the remaining wound being brought together by means of silver-wire sutures (Fig. VI).

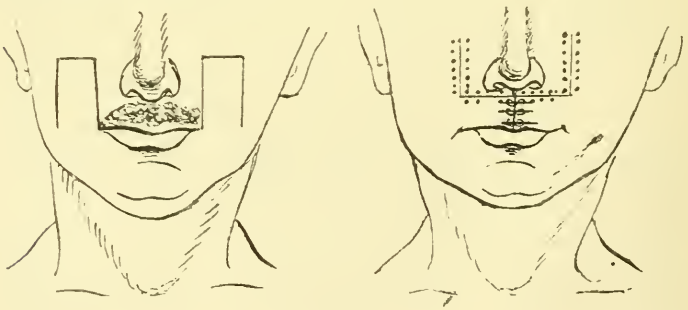


Fig. VI.

Leidillot has suggested another operation, by means of which the flaps are obtained from the cheeks below the margin of the mouth. He extends the incision at either angle of the mouth by which the upper lip has been removed downwards in a continuous line as far as the lower edge of inferior maxilla, then, continuing at right angles outwards, another incision the necessary distance to represent the depth required for the lip; a third incision parallel with the first is then taken upwards to a point slightly above the line of the mouth, the flaps dissected up and brought together in the middle line by hare-lip pins, the edges of the wound resulting from the removal of the flap being somewhat raised and similarly united (Fig. VII).

Fig. VII.

CHAPTER II.

CANCER OF THE GUMS AND ANTRUM.

Epithelioma is the only form of cancer that affects the gums; it may commence in three ways, viz.:—

1. Primarily, from the mucous membrane of the gums.

2. Secondarily, from continuity, *i.e.*, the epitheliomatous ulceration may extend, from an ulcer already existing, either on the tongue, floor of the mouth, or the mucous membrane of the lip or cheek.

3. The disease may commence in the bone, and extend, pushing itself outwards between the teeth, or in the place from which a tooth has been extracted.

In the first two instances, the disease is always of the squamous variety, whereas, in the third, it is usually of the columnar type.

The disease is of comparatively frequent occurrence, and is usually the result of local irritation, such as that caused by decayed teeth, old stumps, a badly-fitting plate that rubs or pinches the gums in some one place, collections of tartar around the teeth, the constant use of neat ardent spirits, burns or scalds; all of these are common exciting causes of the disease.

In the Cancer Hospital, out of 841 cases of epithelioma, the gums were the seat of the disease in only 25 cases, or at the rate of 2·9 per cent.; in nearly all of these the disease commenced in the gums or floor of the mouth, and extended to the jaw.

This disease must not be confounded with the epulides, and cannot be included among them, as there is very rarely any outgrowth or tumours in their early stage.

Primary epitheliomatous ulceration of the gums or mucous membrane of the mouth commences in a most insidious manner; first a small superficial ulcer or warty growth of the mucous membrane presents itself, which causes little or no pain or inconvenience, and therefore does not attract the attention of the patient sufficiently for him to seek advice; it sometimes grows slowly, at others very rapidly, extending into the floor of the mouth or the cheek; the base of the ulcerated surface becomes indurated, the edges jagged and everted, and the floor of the ulcer has a most eroded and unhealthy appearance.

The primary ulcer of the gum has a great tendency to extend to the alveolar process of the jaw, which speedily becomes softened and absorbed; as the disease extends the teeth are loosened in their sockets, and pushed up, either dropping out or are easily removed. The pain is most agonizing, extending over the back of the head and neck and supraorbital region. There is greatly increased salivation and putrid sanious discharge; and often in the case of the lower jaw spontaneous fracture takes place, as occurred in two cases under my care lately. (*Vide* Cases.)

Although the disease often attacks the jaws primarily, it far more frequently affects them secondarily, extending from an epitheliomatous ulcer of the tongue or lip; these secondary ulcers exhibit the same tendency to attack the jaws, and run the same course as the primary.

In those cases in which the disease is secondary to the disease commencing in the antrum or alveolar process, the patient in the first place notices a good deal of sharp neuralgic pain shooting from the diseased point along the course of the nerve or nerves, causing often most intense agony; as the disease progresses tumefaction of the gum takes place, either between the teeth or in a space where a tooth has been removed; the teeth in the immediate neighbourhood become loosened, and an unhealthy sanious discharge takes place between the gum and the

teeth; presently the mucous membrane breaks down and ulcerates, and a large, deep, filthy, ulcerated surface presents.

In all the varieties the submaxillary glands become affected very early, and the tissues around infiltrated with the disease, which speedily break down, and abscesses are formed, which point in the neck or beneath the jaw. When cases have arrived at this state the patient rapidly succumbs, either from hæmorrhage, blood-poisoning, or exhaustion from inanition.

It is these tumefactions that push up between the teeth or alveolar process which are very likely to be confounded with epulis, and indeed it is most difficult to diagnose between them in the early stages. Thus, Mr. Christopher Heath, in his work on diseases of the jaws, mentions a specimen which was sent to him by "Mr. Hutchinson, who had removed it from the lower jaw of a lady aged 55, where it had been growing for a year; this specimen was examined by the late Mr. Bruce, with the following report: The surface of the tumour is covered with healthy mucous membrane. The interior is whiter, and firmer and more compact, than the surface, but there is no line of demarcation between the tumour and its mucous covering. The structure of the growth is distinctly glandular, very much resembling some forms of compact adenoma of the breast. At the point of attachment of this to the part beneath a remarkable transformation of the glandular into the epitheliomatous structure may be seen. In one part of the section may be seen the cut ends of glands tubules, whilst in their immediate neighbourhood are most distinct nests of true epithelioma, consisting of concentrically arranged cells compressed from the centre outward." Mr. Eve has also placed in the Museum of the College of Surgeons an epulis which microscopically had the character of an epithelioma, but contained no cell-nest.

Epithelioma of the Antrum is a very insidious disease, and also of rare occurrence. I have never met with a case. Christopher Heath says it was first described in the "Clinic"

of M. Verneuil by M. Reclus (Progrès Médical, 1876), who termed it very aptly "épithélioma térébrant;" and Mr. Butlin drew attention to it in 1881.

M. Reclus suggests that the disease originates in one of the periosteal cysts of the fangs of the teeth; but Mr. Heath thinks it more probable that it starts from the socket of the tooth, and derives its squamous character from the palate. Epithelioma slowly destroys the mucous membrane of the antrum, attacking the bone, and spreading along the canal leading from the antrum in all directions.

It is most important that this disease should be recognized early, as it advances so insidiously, but at the same time so quickly, that without early surgical interference is had recourse to there is little hope of eradicating it; the attachment of any growth to the fangs of an extracted tooth should excite suspicion as to the presence of the disease.

In the case narrated by Mr. Heath, and that by Mr. Butlin, the disease had extended too far before operative proceedings were adopted, and then it was found it had extended beyond the reach of the surgeon.

Mr. Heath in his work describes two cases that were under his care, one of which at first was thought to be epithelioma of the palate, but in which the antrum was found extensively diseased; the other was a good typical example of the epithelioma.

"The patient, aged 66, had a troublesome and loose upper molar tooth, for which he consulted a well-known dental surgeon in the west of England, who extracted the tooth; the disease then speedily became apparent, bringing away a soft growth attached to the fangs.

"The opening was found to communicate with the antrum, and shortly a fungous growth protruded, and there was a good deal of discharge. The case was regarded as one of disease of the antrum, which was well syringed out, but the palate

became more involved, and the cheek somewhat swollen. When Mr. Heath saw the patient in September 1881, a month after the extraction of the tooth, there could be no doubt of its serious nature. Under chloroform he was able to pass his finger through the fungus completely into the antrum, which was widely affected. Turning up the lip without incising it, he was able with saw and bone forceps to remove the floor of the antrum, which show the disease very well (College of Surgeons Museum, 2247). He then removed the back of the antrum, but the orbital plate being apparently healthy, he contented himself with scraping it freely and applying the chloride of zinc paste, the age of the patient forbidding removal of the whole upper jaw. Recurrence took place, and he again scraped away the growth and applied the zinc paste, but the disease again made progress, and the patient died worn out within a year of the first appearance of the disorder."

Mr. Butlin (Pathological Society's Transactions, 1881-82) has recorded two cases, one under his own care, and one under Mr. Morrant Baker, the ages being respectively 62 and 85.

Diagnosis.—Primary epithelioma of the gums is difficult to distinguish from some forms of simple ulcers in their early stages. Malignant growths, if limited to a small area, have often much the appearance of aphthous ulceration, but there are many considerations which would guide the surgeon to a correct diagnosis.

In the first place, the age of the patient is a most important consideration, as cancer is very rare in early life, in fact, is very seldom met with before the age of 40, and is more common between 50 and 60, whereas aphthæ and simple ulceration is a disease almost essentially of youth, and under appropriate treatment speedily gets well.

Cancrum oris may be mistaken for epithelioma; here again, however, the age of the patient would almost invariably

guide one in distinguishing the one from the other, as cancrum oris is, as aphthous ulcer, a disease of childhood and youth, and may be looked upon as an asthenic degenerating ulcer in a debilitated constitution, which speedily yields to appropriate treatment, whereas cancer resists all treatment, and, as it extends, its base becomes hard, and the ulcer seems fixed and unyielding, while the edges are gristly, everted, and jagged.

Syphilitic ulcers of the gums may usually be distinguished from cancerous by the history. These ulcers are, however, often very puzzling. A case, in a man 63 years old, came under my notice a short time since: he was sent to me, as he was thought to be suffering from malignant disease of the gums and floor of the mouth. The ulceration had many of the characteristic symptoms of epithelioma. There was no history of syphilis, so far as I could find from the man, yet there was that about the ulcerated surface which made me doubt, so I put him on a course of iodide of potassium and perchloride of mercury, with the result that the ulcer gradually assumed a more healthy aspect, and in the course of three or four weeks had quite healed.

This case was a very instructive one, and demonstrated how careful one should be before giving a verdict in a case where there is any doubt whatever, without, in the first place, giving treatment a fair trial.

Treatment.—If seen sufficiently early, the ulcer may be destroyed by the local application of any powerful caustic which will thoroughly destroy the tissues, or by the free use of Paquelin's thermo-cautery. In no case must mild caustic, such as nitrate of silver or sulphate of copper, be used, as they only tend to irritate without destroying the part, and very much more harm is likely to be done than benefit derived.

I, however, infinitely prefer the free use of Paquelin's cautery, over which the surgeon has complete control, he being enabled to destroy just as much as he wishes to, without

jeopardizing the surrounding tissues. After the first application the patient must be constantly watched, and if any fresh growth is observed, it must be at once destroyed.

It is seldom, however, that the patient seeks the aid of the surgeon early enough for any kind of cauterization to be effectual, as the disease has too often attacked the alveolus; in these cases the affected part of the alveolar process and jaw must be removed; this is accomplished by making two vertical incisions with a small saw on each side of the growth, being careful to get thoroughly clear of it, and then removing the intermediate portion of bone with bone forceps.

Should the disease have extended deeper, the surgeon must not hesitate to remove the entire portion of the bone so diseased; and here I think it highly desirable to remove, if the growth is situated in the molar region, the affected half of the jaw.

If the disease is limited to the incisor portion of bone, I have seen excellent results from removing the whole of that portion of the bone; the two remaining halves of the jaw are drawn together by their muscular attachment, and soon become united by firm fibrous tissue. A case illustrating this was under my care some two years ago (*vide* Case IV): it was that of a Chelsea pensioner who was admitted into the Cancer Hospital in 1883, suffering from extensive epitheliomatous ulceration of the gums of the lower jaw, the disease corresponding in extent with the incisor, canine, and first left bicuspid teeth, extending along the floor of the mouth as far back as, and implicating, the frænum; the sublingual glands were also affected. I removed the whole of the bone which was implicated; the two halves speedily united, and the man made a good recovery. He, however, had a return in some of the glands eighteen months after, and, refusing to submit to another operation, died about two years subsequent to the operation.

Of epithelioma of the antrum but little need be said, as

directly suspicion is excited of the existence of the disease, if it can be corroborated by the extraction of one of the molar teeth, and if the patient's strength will allow of it, the upper maxilla should be removed.

Mr. Christopher Heath, in his work on disease of the jaws, also mentioned several cases in which he has operated with good results, and quotes others in which other surgeons had operated with equally happy results. He says, in ending his remarks on the treatment: "Both in this and in other similar cases I have been disappointed with the operation of removing solely the alveolus, and am inclined to adopt more radical measures at first, in future." In this I fully agree with him, as I consider in this, as in all other forms of cancer, the only hope we have of permanently benefiting the patients suffering from this disease is by free and extensive operations, *i.e.*, thoroughly removing the whole of the cancerous tissues and getting to healthy structures.

CHAPTER III.

CANCER OF THE JAWS.

Both the upper and lower jaw are subject to tumours and growths of various kinds, innocent and malignant, and it is often very difficult to diagnose the one from the other in the early stages of the disease; but it is highly important that such a diagnosis should be made, as what may, in an early stage, be innocent, say, enchondroma or osteoma, is very likely to take on a malignant character.

The jaws are not so frequently the seat of epithelioma as either the lips or tongue. At the Cancer Hospital, in 841 cases of epithelioma, there were only 20 in which the jaws were the primary seat of the disease, or at the rate of only 2·4 per cent., whereas the lips were affected in 18·7, and the tongue in 19·8, per cent.

It will be more convenient for the purposes of this article to describe the tumours affecting the upper jaw first, and then pay attention to those affecting the lower jaw.

Upper Jaw.

The upper jaw is often the seat of *Fibroma, Enchondroma, Osteoma, Spindle-celled Sarcoma, Myeloid Sarcoma, Chondro-Sarcoma,* and *Ossifying Sarcoma* among the so-called non-malignant, and *Round-celled Sarcoma* and *Epithelioma* in the malignant, class.

To enable one to arrive at a correct diagnosis of the malignant from the non-malignant, it will be necessary to give a short account of all the tumours.

Fibroma.—This does not differ in structure materially from

fibrous tumours in other parts of the body. It usually arises from some part of the periosteum covering the inner surface of the antrum or the alveolar process, and frequently from the periodontal membrane; it is slow of growth, but invades steadily the surrounding structures. When it arises from the interior of the antrum, it bulges out either the palate or the anterior wall of the antrum, causing a swelling of the face beneath the orbit, which increases slowly and surely. It may also cause absorption of the bones by pressure after a comparatively short time; when it extends on the nasal side of the antrum, it pushes the thin plate of bone and turbinate bones across the cavity of the nostril, and, absorbing these bones, presents itself in the nostril as a polypus, and has not been unfrequently mistaken for one. Should it project upwards it will destroy the floor of the orbit and protrude from its inner margin on to the cheek.

When the tumour arises from the alveolus, it may grow on to both the facial and palatine surfaces, absorbing the bone between it and the cavity of the antrum, and speedily filling that cavity.

The growth of these tumours is very slow, and not attended with any great amount of pain and little or no constitutional disturbance, until it attains such a size as to interfere with respiration or deglutition.

The cause of these tumours is uncertain, but they often follow a blow or some local irritation, resulting from the stump of a tooth, or a decaying tooth.

These tumours, although non-malignant, have the greatest possible tendency to recur, and may, and probably will, do so again and again after removal.

Enchondroma of the upper jaw is a very rare affection, and need not be more than noticed here. On removal it is very apt to recur.

Osteoma may be simply an hypertrophy of the whole or

some portion of the bone; it is slow of growth, and quite painless. Tumours of ivory hardness, however, are found springing from the bone, often extending into the orbit, pushing the eye-ball from its place, and causing intense pain. These tumours grow very slowly; thus, as mentioned by Mr. Heath, in a case reported by Mr. Hilton, the tumour had been twenty-three years coming before he saw the patient. Another case, operated on by Sir William Fergusson, the tumour had been twelve years attaining the size. Other cases are also recorded by Mr. Christopher Heath in his work on diseases of the jaws. These tumours, if thoroughly removed, appear to have little disposition to return.

Spindle-celled Sarcoma.—Under this head are included all those cases that formerly were classed under the head of recurrent fibroid and fibro-plastic tumours, the fibro-sarcomata; and undoubtedly many of the tumours which were removed, and considered to be fibroma, were in reality spindle-celled sarcomata. This form of tumour is classed by Mr. Heath among the non-malignant type of tumours, but I very much prefer to include it and all sarcomatous growths with the malignant type, as from their rapid growth, vascularity, and constant tendency to recur, I look upon them as being as dangerous to life as carcinoma.

Chondro-Sarcoma and Osteo-Sarcoma, I am inclined to think, are merely varieties of the same disease, that is, they are sarcomata mixed with cartilage in the one case, and ossification in tumours containing sarcomatous elements in the other. The chondro-sarcomata are very liable to be accompanied or followed by secondary deposits, especially in the lungs; this form is certainly more liable to this than the osteo-sarcoma, although this also is occasionally so followed.

A *Sarcoma* is what Billroth designates a tumour consisting of tissue belonging to the developmental series of connective tissue substances (connective tissue, cartilage, bone), muscles, and

nerves, which, as a rule, does not go on to the formation of a perfect tissue, but to peculiar degenerations of the developmental forms.

Green describes *Spindle-celled Sarcoma* as being composed of closely packed, unusually thin, elongated spindle or oat-shaped cells. These cells are, in some cases, very small, measuring only the $\frac{1}{1500}$th of an inch in length, in others longer; in these latter the cells are thicker, and the nuclei and nucleoli are especially well marked, and very often multiple. Usually there is no intercellular substance; occasionally, however, it is met with; it may be homogeneous and soft, or fibrous; if the fibrous portion preponderates, the tumour may be called fibro-sarcoma or fibroma. Thus we see the fibroma are closely allied to sarcoma. These forms of sarcoma are frequently encapsuled, more so than any other form.

They, however, recur again and again after removal, notwithstanding that the surgeon removes what appear to be thoroughly healthy tissues around the growth; thus it is clear that the disease must implicate the surrounding tissues to a very great extent. The lymphatics are not often affected, at any rate not until quite late.

They always spring from the connective tissue, more frequently from periosteum than any other perhaps. Thus, in two cases I operated upon lately, the one was a large growth springing from the periosteum of the spinous process of the lower dorsal vertebræ; this growth had been removed three times before I saw it. Another case was that of a youth, aged 18, who was sent me from Hull, with a large polypus projecting from the nostril, and also extending into the orbit through the lachrymal canal; this growth arose from the periosteum of the middle turbinate bone and superior maxilla. (*Vide* Case No. VII.)

Myeloid Sarcoma is very closely allied to the spindle-celled variety, and is frequently met with in the upper jaw. These growths are nearly always found in connection with

bone, and generally in connection with the medullary cavity. They consist of numerous bundles of fusiform cells, similar to those found in the spindle-celled sarcomata, interspersed with large many-nucleated cells, the so-called "myeloid cells," which resemble the cells of the medulla in a state of excessive irritative activity.

In the jaws they are frequently met with springing from the periosteum of the alveolar process, and presenting a fungating growth in the mouth, constituting one form of epulis. A case I saw a short time ago was that of a young woman, aged 32, who had a softish growth presenting just above the alveolar process of the upper jaw. It had, when I first saw it, all the appearance of a gum-boil, and it was incised, but nothing came out. The case was kept under observation for a short time, and as the growth continued to increase, it was decided to remove it. This was done, and, fortunately, it was found to be quite limited in extent to the alveolar process and anterior plate of the antrum. The orbital plate of the superior maxilla was preserved and the growth removed, which, upon examination, proved to be a myeloid sarcoma. The patient made a good recovery, and eighteen months after the operation there was no return of the disease.

Round-celled Sarcoma is softer and more friable than the spindle-celled growths. It is of frequent occurrence in the upper jaw. It is highly vascular, and most rapid in growth, and quite as malignant as encephaloid cancer, for which it is often mistaken. In fact, clinically, it is almost impossible to distinguish the one from the other, neither is it important to do so, as the prognosis and treatment are identically the same.

Microscopically, it is seen to consist of elementary embryonic tissue. It resembles very much the upper layer of granulation, and contains small round cells, like lymph cells. There is scarcely any intercellular substance perceptible. This, however, varies in different cases. Occasionally the cells are larger, and contain large round or oval nuclei with bright nucleoli. Green

describes these growths as "of uniform soft hair-like consistence, somewhat translucent or opaque, and of a greyish or reddish white colour. On scraping the cut surface they yield a juice which is rich in cells. They are exceedingly vascular, the vessels often being dilated and varicose, and, from their liability to rupture, they frequently give rise to ecchymosis and to the formation of sanguineous cysts. They grow from the cutis, the subcutaneous cellular tissue, the periosteum, the fasciæ, and connective tissue of organs. They extend rapidly by peripheral growth, infiltrate the surrounding structures, reproduce themselves in internal organs, and often involve the lymphatic glands. From their clinical and physical character, these tumours are very liable to be confounded with encephaloid cancer; they are distinguished by the absence of an alveolar stroma, and by the penetration of the intercellular substance between the individual cells."

The favourite seat of these growths seems to be about the bones, either intra or extra. They are more common in the superior maxilla, perhaps, than any other bone in the body; they usually occur singly, and, when springing from the interior of the antrum, spread very quickly, presenting in the nostrils as a fungating mass, resembling a polypus, very vascular, and readily bleeding if interfered with. They also, if left alone, absorb the orbital plate, pushing the eyeball forward and outward, and often, by absorption of the anterior plate of the antrum, infiltrate the tissues covering the bone and skin, resulting in a large fungating mass on the cheek; the gums become swollen, round or oval, and slightly lobed: as the disease extends, it absorbs the bony structures around, displaces the alveolar process, ascends to the orbit, and sometimes even to the frontal sinuses, blocks up the nares, and sometimes causes obstruction of the pharynx. These growths are most frequent in young persons, and very rare after middle age. They commence usually without any known cause, such as an injury, &c.

They often spring from the posterior surface of the bone, pushing the whole maxilla forward, and in these cases may extend to the sphenoid bone, and, passing through the foramina in that bone, enter the skull. When the growth arises from the surface of the malar bone, it quickly pushes the cheek forward, and spreads to the mouth, involving the soft structures of the face, which may ulcerate. In these cases the superior maxilla becomes affected secondarily. These growths not uncommonly affect the lymphatic glands.

Epithelioma very often attacks the upper jaw, and is found in both the squamous and columnar varieties; the former usually commences in the mucous membrane of the gums or palate, and extends upwards along the sockets of the teeth to the interior of the antrum. The columnar variety commences always from the mucous membrane lining the antrum, or from the nasal fossæ, from thence extending to the palate. Both varieties spread very rapidly, and follow much the same course as has been described of the sarcomatous growths. When removed they are very liable to recur; the lymphatics become affected early in the disease.

This disease is rare in youth, and most frequent between the ages of 50 and 60.

This form of epithelioma is not uncommonly met with mixed with sarcoma, that is, you find columns of small round epithelia with a stroma in which sarcomatous tissue is often present.

Epithelioma is of very rapid growth, and often by pressure absorbs the bony tissue with which it is in contact, thus causing swellings and fungating masses to appear in the palate, which, in their early stages, may be, and often have been, mistaken for abscesses.

The disease at its commencement is unaccompanied by much pain, the patient merely complaining of a dull, heavy sensation in the side of the face, accompanied sometimes by neuralgic pains over the forehead and supraorbital region.

As the disease progresses the pain and sense of weight increase, and eventually the patient may suffer excruciating agony, which nothing but large doses of morphia will relieve.

Diagnosis.—This is no easy matter, and often it is impossible to say for certain whether a tumour of the upper jaw is malignant or not until it has been removed; even suppuration into the antrum or cystic enlargement of the jaw is not always to be diagnosed with certainty from a sarcomatous growth. Should there be any doubt, however, it may be easily removed by extracting the first molar tooth and puncturing the antrum, when the true nature of the disease will be made apparent.

If care is taken, however, the surgeon may arrive at a pretty fair conclusion.

It must be remembered that all the more innocent tumours, viz., fibrous, cartilaginous, and osseous, are slow of growth, more especially the two latter. The general health is good, even though the tumour attain a large size, and the skin and surrounding tissues are not affected or implicated in any way by the disease; whereas, in sarcomata or carcinomata, the growths of both increase very rapidly, the tissues surrounding the tumour become implicated very early, and the growth, if not interfered with, quickly absorbs the bone, and presents itself as an ulcerating mass, either on the face, the orbit, the nostril, or palate. The sarcomatous growths are also very vascular. To distinguish between the spindle-celled and myeloid sarcomata and the round-celled sarcomata and epithelioma is also a most difficult matter; the two latter, however, grow very much more quickly, are more painful, the patient, as has already been stated, complaining, even in the early stages, of violent neuralgic pains and a sense of weight and gnawing about the part affected. It by-and-by presents large fungating masses, either in the nostril, palate, or on the face, whereas the two former never fungate, although they ulcerate through the mucous membrane or skin.

In examining a patient suffering from a tumour of the upper

jaw, too much care cannot be taken; the family history might influence you in your decision. *Age* plays a very conspicuous part. The length of time the tumour has been coming is most important. If of considerable size and of short duration in a person over 30, you may at once be sure it is either a sarcoma or carcinoma.

The roof of the mouth and the alveolar process should be carefully examined, to see if there is any bulging of the palate or displacement of the teeth. The general contour of the face should be observed: sometimes there is a trifling fulness, only perceptible to the touch; at others, the swelling may be such that there is no difficulty in seeing it; the eyeball may be very slightly displaced. The nostrils should be most carefully examined, as often the nasal plate of bone of the antrum is pushed inwards, obstructing the nostril before the disease presents itself elsewhere.

Polypi are often present in the nostril, which, if not carefully examined, may be mistaken for growths protruding from the antrum; these can all be easily distinguished by means of a strong light being thrown into the nostril while a probe is passed along to the root of the polyp, when its origin will be made apparent.

The posterior nares should also be carefully explored with the finger, to see if there be any growth extending into the pharynx or posterior nares, either from the base of the skull or the posterior part of the upper jaw-bone.

Prognosis.—Should the patient be seen before the disease has progressed too far, and implicated the surrounding parts, I think complete extirpation of the disease, with, if necessary, the whole of the superior maxilla, gives a fair and reasonable hope of recovery. As in the case I have already mentioned of myeloid sarcoma in a young woman, the disease was removed freely, leaving, however, a portion of the orbital plate. This patient had no return of the disease eighteen months after the operation, whereas, at the time she was

operated on, the growth was increasing very quickly. But it is very rarely we see patients so early as this, and if the disease has trespassed beyond the confines of the antrum, and involved the soft tissues around, notwithstanding you may appear to remove the disease very thoroughly and completely, it will almost certainly return. This applies to fibroma, spindle-celled sarcoma, and myeloid sarcoma as much as to the more malignant varieties of disease affecting the bone. This is my reason for preferring to include all these growths under the head of malignant, as tumours which are treated in the same manner, and the prognoses of which are nearly similar, are, clinically at least, identical.

Garretson, in his "System of Oral Surgery," says: "Histologically, tumours found to run into each other in the manner in which these tumours are found to do, no absolute line of demarcation existing between the extremes, should be classed under a common head. Simple fibroma cannot be demarked, as extremes are concerned, from recurring fibroma. Recurring fibroma cannot be distingnished from sarcoma, sarcoma cannot be demarked from encephaloma. Deduction: the most simple of fibroma differ from the most complex of encephalomata alone in feature of expression; the family is one."

Treatment.—Iodide of potassium and iodine have been reputed with the removal of some growths about the upper jaw; in my hands, however, they have utterly failed to arrest, much less cause absorption of, any of the growths, whether simple or malignant. The only means of effectually dealing with these recurring or malignant tumours is by early and free excision.

Operations.—Operations for the removal of portions of the jaw have been practised since the year 1693, when Akoluthus, of Breslau, is reputed to have performed this operation.

Mr. John Lizars, of Edinburgh, as Mr. Christopher Heath tells us, appears to have been the first in this country to

propose the removal of the whole of the superior maxilla in the year 1826. Although, however, he ligatured the carotid artery, the hæmorrhage is reported as having been so great that he was obliged to discontinue the operation. In the commencement of the same year, however, M. Gensoul, of Lyons, removed the entire superior maxillary bone, with a part of the palate, successfully from a boy, aged 17, for a fibro-cartilaginous tumour.

The Americans, however, claim the credit of having first excised the upper jaw, Dr. Jameson, an American surgeon, having in the year 1820 completely removed the bone. In 1828 Dr. David Rodgers, of New York, excised both upper maxilla. After this date the operation became thoroughly recognized, it being performed by surgeons throughout England and France and the United States.

Formerly, however, the operation was never performed without in the first place ligaturing the common carotid artery, and it was some time before surgeons dared to excise the bone without having first done so. The actual cautery was always held in readiness as a means of controlling hæmorrhage; now, however, Paquelin's cautery has quite supplanted the old cautery iron.

Excision of the upper jaw is practised chiefly for malignant disease of the bone; but the results are not, on the whole, satisfactory. This is not, however, from the severity of the operation, but from the nature of the disease.

The manner of performing the operation has been varied by different operators. Mr. Lizars made an incision from the angle of the mouth to the malar bone, and reflecting the flap thus made, in cases where the tumour was very large he extended his incision at the malar end by making another at right angles to it extending to about half-an-inch to an inch on either side of the original cut; he also divided the upper lip in the middle line. He then removed the bone by means of the saw

and bone forceps, dividing the hard palate and bony attachments at the malar and nasal extremities of the orbit.

Mr. Syme and Liston extended and modified these operations for large tumours. They omitted the vertical incision at the malar bone, and substituted an incision from the external angle of the orbit downwards along the side of the nose around the alæ nasi to meet the incision through the upper lip.

The objection to both these operations is that the facial artery and nerve were divided very low down, resulting in great deformity afterwards. To Sir W. Fergusson undoubtedly is due the credit of having suggested and practised a method of removing the bone whereby this deformity was avoided.

His operation, which is that adopted by surgeons of the present day, was conducted as follows:—He in ordinary cases divided the upper lip in the middle line, and if that did not allow enough room to remove the tumour he made an incision from the inner angle of the orbit down the side of the nose and around the alæ nasi to the nasal extremity of the incision through the lip; he then reflected the large flap thus made and removed the bone. Should the tumour, however, be so large and the orbital plate affected extensively, he made another incision parallel with the orbital ridge of the submaxilla from the malar bone to the inner angle of the orbit; by reflecting this the whole bone is brought into view.

A narrow-bladed saw is then introduced into the nostril, after having removed the two central incisor teeth, the alveolar process is divided slightly to the side of the middle line to which the disease exists, so as not to interfere with the septum nasi; the ascending process of the superior maxillary bone is then divided into the orbit by means of bone forceps, and the malar bone cut through by notching it with the saw and then completing the division with the forceps. The whole bone is then seized with Lion forceps, when it is easily removed from its bed, the soft palate and remaining attachments being

severed with the knife. The gap left by the removal of the bone must be filled with lint soaked in carbolized oil, and the edges of the wound brought together with either silver-wire or horsehair sutures, the upper lip being united with hare-lip pins.

During the operation often there is free hæmorrhage, but this is easily controlled by the rapid application of the clamp forceps; and after the flaps have been reflected it is well to ligature the facial and other arteries, which may cause trouble, before dividing the bone. In the later stages of the operation, when separating the bone from the soft palate and other attachments, the internal maxillary may be wounded; this, however, is readily secured on account of the large gap caused by the removal of the bone.

In operating on the upper jaw the surgeon should always endeavour to leave the orbital plate, if possible; also, in small innocent tumours, the alveolar process and palate may often be spared. Thus, recently I succeeded in removing a large spindle-celled growth from a lad, aged 19, without taking away the palate and alveolar process. In these cases, after making the usual incision by the side of the nose and through the upper lip, the surgeon proceeds with a Hey's saw to cut through the anterior plate of the antrum, just above the alveolar process. He then, by means of the bone forceps, divides the process of bone into the orbit, and cuts through the other plates of the antrum, when the growth is easily removed. In the case I refer to the growth sprung from the middle turbinate bone, and forced its way downwards through the nostril outwards, filling the antrum, and upwards into the orbit and œthmoidal cells.

In removing the bone, with a view of preserving the orbital plate, the same incisions are made in the soft parts, and the anterior plates of the antrum divided with Hey's saw parallel with and just below the orbit, the remainder of the operation being conducted as for removal of the whole bone. This operation has

been practised for the removal of large fibrous naso-pharyngeal polypi.

For the removal of growths springing from the body of the sphenoid or posterior part of the superior maxilla, Langenbeck has devised an operation which he calls "the osteo-plastic resection of the jaw," and is thus described by Erichsen. His first incision began at the insertion of the ala nasi, and ran along the lower border of the malar bone, describing an arch with the convexity downwards, and terminating at the middle of the zygoma. The second began at the nasal process of the frontal bone, and, following the lower margin of the orbit, crossed the frontal process of the superior maxillary bone, and joined the lower incision. The soft parts were not dissected up. The lower incision was then carried to the bone and the masseter dissected from its attachment to the malar bone. By depressing the lower jaw so as to remove the coronoid process out of the way, the finger can be forced into the spheno-maxillary fossa, which is dilated by the tumour into the nose through the spheno-palatine foramen. A narrow saw is now passed along the finger, its point being protected by the forefinger of the left hand, introduced into the nostril, and a cut is made directly forward through the ascending process of the palate bone and the body of the superior maxillary bone, across the cavity of the antrum, parallel to the hard palate, and immediately above it. The upper incision is now deepened, and the soft parts raised from the floor of the orbit and from the angle between the zygoma and the malar bone, and the saw being again introduced, a cut is made through the malar bone into the spheno-maxillary fissure, and thence across the floor of the orbit as far as the lachrymal bone. The wedge-shaped piece of the superior maxillary bone, included between these cuts, is now only attached by its connections with the nasal and frontal bones, and by the soft parts covering it, which were untouched. By introducing an elevator into the cut in the malar bone the

whole piece is lifted up, bending in its attachments to the malar and frontal bones as upon a hinge, until it is completely turned inwards and upwards over the opposite side of the face. The tumour is then removed from the pterygo-maxillary region, the bone replaced, and wound closed.

Removal of both upper jaws has occasionally been practised. Mr. Lane removed the greater part of both bones in a case of spindle-celled sarcoma, together with the vomer, &c. The tumour implicated both superior maxillary bones and filled both nostrils.

Dr. David Rodgers, of New York, removed successfully both superior maxillas as far back as the year 1824. Heyfelder has performed the operation three times. The method he adopted was to make two incisions from the outer angle of the eyes to the corner of the mouth, and reflected the flap, then made with the nose over the forehead. He then passed a chain saw through the spheno-maxillary fissure on each side, and divided the jaws and malar bones from behind. The junction with the nasal bone and vomer were then divided with the bone forceps, and the soft palate separated from the margin of the hard. Lastly, powerful traction upon the bones was exerted and the whole displaced.

This extensive operation, however, can very rarely be necessary; and if the disease has extended so far as to implicate both bones, I doubt if the surgeon is justified in recommending the patient to submit to such an operation, which, at the best, can prolong his life but a very short period.

In performing these operations about the upper jaw, I prefer the patient being placed in the recumbent position, with his head rather raised. I also, before commencing to operate, plug the posterior nares with a moderate-sized sponge with string attached to it; the sponge must be pushed well up and behind the soft palate, and care must be taken that it is not too large, otherwise it may force the palate down so as to interfere with the breathing when under the influence of the anæsthetic.

The operator and anæsthetist will experience great comfort from this precaution, as the blood by this means is prevented trickling into the pharynx and larynx.

In severe operations it has been suggested to perform the preliminary operation of tracheotomy, and then plugging the pharynx with a large sponge; but, as Mr. Heath has said, "for all ordinary cases of removal of tumours of the upper jaw, the proceeding seems to me uncalled for," and I cannot myself see the object in it; in fact, it appears to me to be subjecting your patient to another and severe operation, and decreasing his chance of recovery materially. And I cannot but think in all ordinary cases the plugging of the posterior nares answers every purpose.

In any case, should it, from the extent of the disease, be thought desirable to perform tracheotomy, the operation, in my opinion, should always be done two or three days before the major operation is to be performed.

The after treatment of these cases I consider of the highest importance.

In cases where there is any suspicion of the disease not having been thoroughly removed chloride of zinc paste should be freely applied, care being taken to put pledgets of lint over and around it, to prevent it running into the pharynx, or on to other healthy surfaces. The whole of the parts should be thoroughly dusted with iodoform, and a most convenient instrument for this purpose is manufactured by Messrs. Khrone and Seissen; by means of this insuflator the powder can be blown freely into any cavity. The whole cavity should be irrigated with Condy's fluid and with a carbolized water twice, or when the sloughs are separating three times a-day, after which the powdered iodoform should be again used.

The patient for the first few days, in cases of complete removal of the bone, should be fed, with an œsophageal catheter, with strong beef tea, milk, and eggs, and, if necessary, wine or brandy.

Lower Jaw.

The tumours affecting the lower jaw are both malignant and innocent. The latter consist of fibrous tumours, which are, perhaps, the most common form of tumour of this bone. These tumours arise externally from the periosteum, and are usually the result of periosteal inflammation caused by a blow or the irritation of stumps of teeth.

When the tumours commence between the plates of the bone they arise from the endosteum, and are the result of constant irritation arising from decayed teeth or old stumps.

In both instances the tumours may attain to a great size without causing any grave constitutional disturbance. They are slow of growth, and are usually found in young persons.

The periosteal tumours in their earlier stages are very like epulis; in fact, it is almost impossible to distinguish the one from the other; neither is it important that such diagnosis should be arrived at, as the treatment is identical, viz., free excision of the tumour and the bony structures to which it is connected.

Enchondroma, as in the superior maxilla, is not commonly met with, but when it does occur, it is somewhat difficult to distinguish between it and fibrous or malignant growth.

Osteoma is met with in two forms: it may be simple hypertrophy of the bone, forming an increase in the cancellated structure; or it may be an ossifying enchondroma; or it may be as an exostosis from the bone itself, in this case the tumour is of ivory hardness. This form is usually met with at the angle of the jaw.

Under the head of malignant tumours of this bone may be included spindle-celled sarcoma, myeloid sarcoma, chondro- and osteo-sarcoma, round-celled sarcoma, and epithelioma. I prefer including all these among the malignant growths of the jaw, for

the same reason as adduced for following the plan in tumours of the upper jaw.

Spindle-celled Sarcoma usually commences as a growth protruding between the teeth or in the place of some old stump. As the growth increases in size it soon pushes up the teeth, loosening and displacing them either inwards or outwards. As the growth increases it becomes more or less lobulated, often forming small secondary processes here and there, in the first place covered by the mucous membrane, which, as the disease progresses, assumes a dark purple hue. This is soon succeeded by ulceration, when a fungous growth speedily sprouts out. This, however, does not, as a rule, occur until quite late in the disease. The consistence is firm, and even hard, and not particularly vascular. The growth, if not interfered with, extends somewhat rapidly, filling the mouth, and forcing the jaw downwards and the tongue backwards. In this state the patient is in imminent danger of being killed either by inanition or suffocation, and suffers excruciating agony, while violent neuralgic pains are complained of along the course of the sensory nerves of the face and head.

Even when the disease has assumed these alarming conditions, much may be done to alleviate the patient's suffering, and even to rid him from the disease, by free and bold operative measures.

The structures of these growths are found on section in the early stages to consist of firm elastic tissue, interspersed with gritty matter and small spiculæ of bone, against which the knife grates as it cuts through the growth. There are also generally a number of small cysts caused by the breaking down of the tissues; these cysts are filled with a sanguineous inodorous fluid.

The growth itself is often found to be encapsuled, although pushing itself into the interstices of the bony structures around; it is difficult to demonstrate this excepting quite in the early

stages of the disease. Although, I believe, the disease never incorporates itself with the surrounding structures, or assimilates them to its own nature, yet microscopically these growths are identical with the spindle-celled sarcomata of the upper jaw.

Myeloid Sarcoma is comparatively common in the lower jaw, and usually attacks young people under 30 years of age. The disease generally springs from the cancellous structure of the bone, and, when excised with the bony structure to which it is attached, is very frequently entirely removed without fear of recurrence. The growth, if projecting into the mouth, presents a dark purple appearance, sometimes, as described by Sir James Paget, of a mottled red and purple colour resembling some nævi; it is very vascular, bleeding readily if cut. The patient may suffer little or no pain, and will bear a digital examination without complaining of much tenderness.

These growths are very soft, and often contain cysts of varying size. The cut surface is pinkish at the margin, and of a yellowish colour in the centre, due to fatty degeneration. Hæmorrhage very commonly occurs in these tumours, causing purple patches to be seen over the surface.

If not thoroughly removed it quickly returns, but if completely excised it very rarely recurs, either locally or in any internal organs.

It usually commences on one half of the jaw; sometimes it originates in the symphysis; and occasionally, as in a case reported by Mr. Christopher Heath, it is present on both sides. The case referred to by Mr. C. Heath is that of a boy, aged 7½ years, who was under his care suffering from a remarkable enlargement of both sides of the lower jaw. When a year and a-half old the mother first noticed an enlargement first on one side (right ?), and then on both, which has been gradually increasing. He has never complained of any pain, but had a good deal of difficulty with his teeth. He was rickety

in his legs. The tumours were smooth on their outer and lower parts, but slightly nodulated at the upper. Within the mouth they extended up to the level of, but did not encroach upon, the teeth. He had cut his permanent first molar and incisors; the temporary canine and molars were still present and somewhat decayed. Mr. Heath operated upon first one side and then the other, sawing away the prominent portions with a narrow saw, and then with gouges and bone forceps removed as much of the semi-cartilaginous structure as he could without interfering with the teeth or opening the mucous membrane. This boy did remarkably well, and is reported as being free from any return of the disease at the time of the publication of Mr. Heath's work, seventeen years after the operation.

A good specimen of this disease attacking the lower jaw is shown in University College Hospital Museum, No. 680, and is thus described:—

"The left ramus of a lower jaw, with an adjoining part of the body about two inches in length. Immediately in front of the ramus the body of the jaw, with the exception of its lower border, is expanded by the growth of a small myeloid tumour which has protruded above through the alveolar process, so as to form a second superficially lobulated and somewhat flattened mass, covered with mucous membrane, and overhanging that part of the growth which is inclosed by the bone.

"The parts were removed, for the disease shown, by Mr. Liston."

Chondro-sarcoma is not nearly so commonly met with as the two last forms of sarcoma; it is usually, as its name infers, a mixture of enchondroma with round and spindle cells interspersed throughout the tumour; in the primary stage the cartilaginous structure is largely predominant, but after removal, on the tumour recurring, the character is much altered, and the round cells, with some spindle cells mixed in a fibrous stroma, are the prevailing elements of the tumour, the cartilage cells being comparatively few. This form of tumour is very liable to recur again and again after removal, and each time, I think,

with more malignancy. Its growth is very rapid from the commencement.

The exciting cause is commonly a blow, or some injury to the bone itself. Its usual site is the angle of the jaw, and as it grows it pushes out the outer plate of bone, forming a large, prominent, usually lobulated, tumour over the parotid region. It may, and often does, project into the pterygoid region, causing pressure upon the pharynx and base of skull.

The patient suffers great pain, often of a neuralgic, lancinating character, extending over the course of the sensory nerves of the head and face. Numbness of the chin is also complained of, the result of the tumour compressing the inferior dental nerve. These tumours are usually met with towards middle life. The lymphatic glands here, as in the spindle and myeloid variety of sarcoma, are not commonly affected.

Osteo-sarcoma, so called on account of the growth occasionally becoming ossified extensively in its matrix. This is by no means a common disease, and is very difficult to distinguish from osteoma. It increases in size more rapidly; the original tumour is not nearly of such rapid growth, however, as the recurrent disease after removal of the primary tumour: it, like enchondroma, is very liable to recur after removal, and the primary disease is chiefly composed of bony tissue, mixed with round and spindle cells, in a fibrous stroma. The recurrent tumours have very little ossific matter in them, and are chiefly composed, as the recurrent enchondroma are, of spindle and small round cells in a firm fibrous matrix, with certainly a fair quantity of rudimentary bony tissue.

These tumours are most frequently met with in people past middle age, and the exciting cause is usually attributed to a blow or injury of some sort, or exposure to cold. The patient complains, in the first instance, of pricking pains in the jaw, but the tumour being usually sub-periosteal much pain is not complained of, at any rate in the early stages of the disease.

Round-celled Sarcomata were formerly classed as medullary or encephaloid cancer, and not uncommonly attack the lower jaw. They are usually found in young people.

These tumours are exceedingly vascular, and sometimes distinct pulsation is to be felt in them. They usually commence in the periosteum, in which case they speedily surround the jaw, and ulcerate through the mucous membrane of the mouth, and even through the cheek, presenting a large fungating mass either in the mouth or externally, bleeding readily, and discharging a sanious offensive matter.

They, however, most frequently commence in the interior of the jaw, and then, growing rapidly, the jaw expands, forming only a thin shell of bone over the tumour, which speedily breaks down, and, as in the former case, a large fungating mass presents itself. In University College Museum there is a good illustration of this, and here, as in the case of myeloid sarcoma, I cannot do better than give the description of this specimen as it appears in the catalogue :—

"666. The right half of a lower jaw, on the body of which a long oval tumour has grown. The morbid growth projects chiefly on the outer side, and its most prominent part has protruded through the skin, forming an overhanging nummular projection, which has an open reticular surface. On the inner side the tumour has invaded the jaw, in places destroying its entire thickness; the growth, however, scarcely projects into the cavity of the mouth. As seen on the divided surface it is composed of a soft, granular, yellowish basis, supported and parted into small polyhedral masses by narrow lines of fibrous tissue; its limit is everywhere definable. Microscopic examination shows the tumour to have all the characters of a large round-cell sarcoma.

"The parts were successfully removed from a woman 60 years of age. The patient was under the care of Mr. Liston."

These tumours not only often pulsate, but to the touch have an elasticity which closely resembles fluctuation, so much so that I have on several occasions known the tumour to be punctured to ascertain if there were fluid in it or not.

Round-celled sarcomata are of very rapid growth and malignant nature, and after removal are most liable to return again and again. During their growth they encroach upon the tissue around and infiltrate it with disease, so that it is very difficult to be sure of complete removal of all the disease. They also very frequently recur in internal organs, and this is not difficult to understand: on account of its extreme vascularity, the cells may easily be conveyed to the lungs or other parts by the blood-vessels.

The lymphatics, although often affected, are not commonly so. The case of a child who was sent to me a short time ago well illustrates this. It was a child about 1 year and 7 months, who was sent to me with a swelling on her right temple, presumably an abscess. The mother first noticed a small lump, the size of a pea, on the right temple, on the 31st August, 1883; it increased in size rapidly, and on the 14th September the child was brought to me. The swelling was then about as large as a chestnut, looking at first sight like an ordinary abscess. It was somewhat tense, semi-elastic, with *apparently distinct fluctuation.* The veins over the tumour were very much enlarged and prominent, and there was a sensation on palpation which made me suspect that there was no pus, but that the tumour in all probability was malignant—most likely medullary cancer. On the 21st the child was brought to me again; the tumour had then grown considerably; the skin in places looked thin and shiny. *Very distinct fluctuation* existed over the whole tumour, but more so on these spots. The swelling now extended forwards as far as the orbit, upwards to the temporal ridge, and downwards to the malar bone. The veins over the whole tumour were much enlarged and very prominent, and another swelling of the size of a nut had formed on the top of the head, apparently under the pericranium. I determined to puncture the tumour with a grooved needle to ascertain the nature of the contents, but only a little bloody serum escaped.

On the 24th a small swelling made its appearance behind the right ear; the tumour on the temple had much increased in size, and the eye was now very much protruded. The two tumours on the head had nearly joined each other. From this time they increased rapidly in size, pushing the eyeball further and further out of the orbit until it fairly lay upon the cheek. The child had no convulsions, but gradually sank, and died on the 13th October, exactly five weeks after the mother first noticed the little swelling on the temple.

Post-mortem examination revealed a large mass of disease compressing the right hemisphere of the brain, quite a cup-shaped depression being formed. On section it was found to be soft, almost of brain-like consistence, very vascular, of a reddish purple colour, and interspersed with fine fibrous bands. Microscopically, it was seen to consist of numerous small round cells closely packed in a thick fibrous matrix. (*Vide* Pathological Society's Transactions, vol. xxxv, page 363.)

The treatment of this disease of the jaw consists in as complete removal as possible, removing the bone well clear of the disease on either side; and here I would strongly advise and advocate the removal of the entire half of the jaw on which the disease exists, as I contend it is impossible to know whether one is free from the disease or not, unless this is done. I would, therefore, in all cases, divide the jaw well to the opposite side of the middle line of the symphysis to that on which the disease is situated, and disarticulate the jaw on the same side. By this means only, I contend, can we expect to free our patient from the disease.

Epithelioma is the only form of cancer which is found in the lower jaw. It exists in two forms, viz., the squamous and columnar-celled, the former being very much the more common form of the disease, as the jaw is more often the seat of cancer secondary to the growth existing in the gum and floor of the mouth, than it is as a primary disease commencing on the

bone itself. When occurring as a primary growth it is of the columnar type, and usually occurs in connection with either multilocular or simple cysts in the bone. Although the squamous variety is usually secondary to ulceration of the gums or floor of the mouth it occasionally occurs as a tumour, and then is usually found to exist at the angle of the jaw or the ramus of the bone. The three cases mentioned in the Appendix well illustrate the forms of squamous epithelioma that are met with secondary to cancerous growths in the lips and gums.

The disease in either form is most rapid in growth. When commencing in the bone itself it speedily attacks the alveolus, loosening the teeth, and causing the gums to bulge and appear as a tumefied mass: the bone (as illustrated in Case VI) is speedily destroyed, and spontaneous fracture is not an uncommon occurrence. The disease, as it progresses, very shortly forms fungating growths into the mouth; the pain is often most excruciating; there is a constant discharge of putrid matter, the patient having the greatest difficulty in taking nourishment, even in a liquid form. The growth extends to the fauces, and death from inanition, or probably septic poisoning, ensues. The lymphatic glands are usually very early implicated, the submental and submaxillary being usually the earliest affected. The glands in the neck quickly follow, and although when the disease is removed there may be no enlargement of the glands perceptible, yet, soon after, to the chagrin of the surgeon, the patient presents himself, perhaps with the wound of the operation completely healed, but with enlarged glands under the angle of the jaws.

Early and complete removal is the only treatment to be adopted in these cases, and here, as in cases of round-celled sarcoma, I would insist upon the entire half of the jaw being excised upon which the disease exists.

Epithelioma rarely attacks people before middle life, and is very much more common between the ages of 50 and 60 than at

any other time of life, the average age being, as shown by the statistics at the Cancer Hospital, 51·39 years.

Diagnosis.—The diagnosis of malignant disease of the lower jaw is comparatively easy, certainly very much more so than those of the upper jaw. In the case of all malignant growths the disease extends very rapidly, and is accompanied, as a rule, with much pain; their boundaries are ill-defined, as often the surrounding tissues are more or less infiltrated with the disease. In the case of epithelioma this is especially the case, and in this form of malignant growth the lymphatic glands are early implicated. Epithelioma also is rarely met with before middle life, and most frequently after the age of 50.

The sarcomata are, on the contrary, usually met with in early life. They grow rapidly, and have very early a tendency to ulcerate through the mucous membrane of the mouth, or even the skin of the cheek, when large fungating growths form, which are very vascular, discharging an offensive sanious matter, and often bleeding freely.

The simple tumours are of slow growth, cause very little pain or even inconvenience, are circumscribed in extent, and very rarely cause ulceration of the skin or mucous membrane excepting if they are allowed to extend without being interfered with; then from simple pressure the skin may slough, and the tumour present an appearance much resembling a sarcoma; in fact, I am strongly inclined to think that these tumours, if left so long unheeded, often take on a malignant character. Innocent tumours are nearly always met with in young people under 30 years of age.

Rapidly-growing tumours of the lower jaw, with ill-defined boundaries, and an elasticity to touch, occurring in young people, may with tolerable certainty be diagnosed as round-celled sarcoma.

Growths increasing rapidly, early affecting the lymphatic glands, and infiltrating the surrounding tissues, occurring in

people past middle life, may with equal certainty be ascribed to epithelioma.

Prognosis.—If the disease, whether sarcomatous or carcinomatous, is seen sufficiently early, there is a very good chance of the surgeon being able to remove the whole of the growth with a fair prospect of its not recurring. The prognosis is infinitely more favourable here than when the disease is situated in the upper jaw, as, from the anatomical relations of the bone, the surgeon is enabled more effectually to remove the whole of the affected parts of the bone.

It is a question whether, if a bone is affected with malignant disease, and the whole bone is not removed with the growth, the portion left is not liable to take on the disease. Thus, in cancer of the tibia or femur, it is a rule that the surgeon should remove the limb at the joint above the disease, viz., the knee-joint or hip-joint.

Now, if this rule is to hold good in the lower jaw in case of malignant growth of that bone, the surgeon should remove the whole jaw; but it must be remembered that at birth the lower jaw is practically composed of two bones joined at the symphysis, and thus I think it is not at all necessary in these cases to remove more than half the jaw; at any rate, in my experience I have never known the disease to recur in the portion of bone remaining; if it recur anywhere, it is in the sympathetic glands and tissues around them.

That the outlook in any case is not good we are bound to admit, and in advising patients as to the best course to pursue we must always take rather a gloomy view of the result, and point out that, in all probability, the disease will return sooner or later.

At the same time, however, we can fairly say that we may be able to prolong life for a year or two, and, in any case, relieve the patient from much pain and suffering.

Treatment.—Here, as elsewhere, we can do little or nothing to get rid of the disease by the aid of drugs. Much may be

done, however, to relieve the terrible sufferings of the patient, and I think also in retarding the disease, by the free use of morphia, while the strength is maintained by arsenic, quinine, cod-liver oil, and a good nutritious diet.

The only means at our disposal at present which gives any chance of eradicating the disease is by free and early removal of the affected parts; and here I would say surgery is able to do very much, if not actually to permanently free the patient from the disease, at any rate to prolong life. Thus, Mr. Christopher Heath narrates, in his work on diseases and injuries of the jaw, several cases in which he operated on patients suffering from cysto-sarcoma of lower jaw, with recovery:—

A case of *epithelioma of lower jaw and floor of mouth*, in which he removed the disease, and the patient two years after was in a satisfactory condition.

Myeloid sarcoma of both sides of the lower jaw, in which he removed both growths, and the patient did well.

Epithelioma of the tongue, involving the lower jaw, in which case he removed the growth and three inches of the jaw successfully.

Epithelioma involving the chin and lower jaw, in which the growth was removed by section of the bone and galvanic écraseur without opening the mouth; this patient recovered, but had a recurrence of the disease some months afterwards.

To these may be added the cases I notice in the Appendix. The one, an old Chelsea pensioner, with epithelioma of floor of the mouth and anterior part of jaw, in which I removed the diseased portion of bone, and the patient made a good recovery; the disease, however, recurred in the submental gland eighteen months afterwards, and he died.

Another case, under the care of my colleague, Mr. Hayward, in which the floor of the mouth and symphysis of lower jaw were affected, the disease was removed, and the man made a capital recovery.

Another case, that of a man in whom I removed the whole of the lower jaw for epithelioma, the bone being affected secondarily to epithelioma of the lip. This case was most successful.

These cases are sufficient to prove that removal of malignant disease of the lower jaw is not only justifiable, but the best possible results may be obtained.

The question of how much of the bone should be removed is still open to doubt. Mr. C. Heath, in many of his cases of malignant disease of one side of the jaw, contented himself with sawing through the condyle of the bone, and not disarticulating it. Dividing the bone at the symphysis, he removed the intervening portion which was diseased. I am strongly of opinion, however, that it is better to disarticulate the bone on the one hand, and divide it slightly to the opposite side of the symphysis to which the disease exists on the other. I do so, as I consider by this proceeding you stand a far greater chance of removing the whole disease, and thus placing your patient in a better position to avoid recurrence.

When the disease is limited to the symphysis, however, it would be certainly most unjustifiable to remove the whole bone; and, as in the cases mentioned by me, most happy results may and have been obtained by dividing the jaw on either side of the disease, taking care to cut the bone at a sufficient distance from the growth. The disease, in this situation, is nearly always secondary to growths of the gums or floor of the mouth, and therefore is limited in the majority of cases certainly to the cortical portion of the bone and not have penetrated into the medullary or cancellous structures, and thus is not so likely to have affected the neighbouring parts of the bone through the lymphatics or blood-vessels.

Operations.—The operation of partial excision of the lower jaw was first practised by Anthony White at Westminster Hospital in 1804; then by Deadrick, of Tennessee, who in 1812

excised the half of the bone from the symphysis to the angle. At about the same time Dupuytren performed a similar operation in Europe, but to the first-named surgeon is undoubtedly due the merit of having been the first to perform the operation. We find that Professor Mott, of New York, performed a similar operation to Deadrick's in the year 1821, but, according to Professor Smith, Mott disarticulated the bone. In the year 1850 Dr. Ackley, of Cleveland, Ohio, is reported as having removed the entire bone.

Dr. Deadrick performed the operation on a lad, aged 14 years, for the removal of a cartilaginous tumour on the left side of the jaw, which nearly filled the whole mouth, causing the greatest difficulty in swallowing, and at times even in breathing. The operation was performed by Dr. Deadrick making an incision from below the zygomatic process, and carrying it across the tumour downwards and forwards to nearly an inch beyond the middle of the chin. From the centre of this incision, and at right angles to it, an incision was made a short distance down the neck; the flaps thus secured were dissected from the diseased mass, and the bone sawed through at the angle, and the symphysis, and the intervening piece of bone, with the tumour, removed; the flaps were then laid back in the usual way, and the boy made a speedy recovery.

The growths for which excisions of the jaw are performed are usually situated on one side or the other of the bone, not very often extending beyond the middle line. The operation necessary for removing these growths are therefore limited to either complete or partial excision of one half of the bone.

It does, however, occasionally, as in the case of M. N.,* although this, fortunately, is of very rare occurrence, become necessary to remove the whole of the bone.

In epithelioma it not unfrequently happens that the symphysis alone is the seat of the disease, in which case that

* *Vide* Appendix of Cases.

portion of the bone only requires excision; and it may happen in these cases that it may be found practicable to remove all the diseased parts, leaving a small bridge of bone at the lower portion of the maxilla, which prevents the two sides of the jaw being drawn together by muscular action, and also maintains its natural formation.

The operation for complete removal of the symphysis is performed by making an incision through the lower lip, in the middle line, to about half-an-inch below the chin, dissecting the two flaps thus made from the diseased bone, and, after passing a strong silk ligature through the tongue, to prevent it being drawn back into the pharynx, sawing through the bone, with either a Hey's, metacarpal, chain, or circular saw, on either side of the mass, detaching it from its muscular attachment in the floor of the mouth by a few touches of the knife. The lip should then be brought together with hare-lip pins, and the ligature through the tongue either fastened to the pins, or, as I prefer, to the forehead, by a piece of adhesive plaster.

If it be decided to excise only the alveolar portion of the bone, it can best be removed by dividing the bone vertically, after extracting two teeth on either side of the diseased mass, with a metacarpal or Hey's saw, as deeply as you may require; then, with a circular saw, cutting the bone horizontally through between the two vertical cuts; the piece of bone is then easily removed.

The surgical engine which is used for driving the circular saw, drills, &c., is the invention of Mr. W. G. A. Bonwill, D.D.S., and the introducing of it into surgical practice is claimed by Professor Garretson, of Philadelphia. He describes it as follows: "While a dental engine is worked by the foot, or by an electric, steam, or motor power, and possesses but a single driving-wheel, the surgical machine is driven by means of a hand-crank, and is intensified in motion by the addition of a cog adjunct. The shaft of the latter is always of arm fashion,

the cable of the former, as at present constituted, being too weak to accomplish other than operations demanding little mechanical power."

In removal of half, or a portion of half, of the jaw, it will be sufficient, as a rule, to make one long curved incision from a point opposite the articulation of the bone, along the posterior and under margin of the tumour as far forwards as the symphysis.

In making this incision, the facial artery is necessarily divided; this should be at once clamped with the clamp forceps and tied. The flap being then dissected up from the growth, the jaw is to be divided slightly to the opposite side of the symphysis to that on which the tumour is, and, if the growth be small, the bone may be again sawn through at the angle, or at any point higher; should the disease be extensive, I think it always safer to disarticulate the bone, and remove the whole. If it is decided to divide the jaw on either side of the tumour, it is advisable not to completely divide it on the one side before sawing through the bone on the other, on account of the loss of resistance consequent upon breaking the continuity of the jaw, the bone being easily finally divided with the bone forceps. In making these incisions it will be necessary to remove a tooth at the points where the jaw is to be divided.

Should the tumour be large, and it is deemed desirable to disarticulate the half of the jaw, it will be better to make a vertical incision through the lip, meeting the curved incision at right angles below the chin. The flap being dissected from the tumour, and the incisor tooth removed, the jaw is to be sawn through with an ordinary Hey's or metacarpal saw, and the bone, being seized with the Lion forceps, is drawn forcibly outwards, whilst the soft structures are divided close to the inner surface of the bone by a few touches of the knife, care being taken to keep close to the bone to avoid wounding the lingual artery or submaxillary gland.

The internal pterygoid muscles having been carefully separated from the jaw, the bone is to be forcibly dragged downwards, so as to depress the coronoid process when the tendon of the temporal muscle will be brought into view ; this is to be divided, when the joint will be exposed ; this must be opened with the knife, when the condyle will be easily displaced, and the ligaments behind being cautiously divided, the bone will be easily wrenched out. Care must be taken not to twist the jaw outwards, or there will be a danger of lacerating the internal maxillary artery and causing troublesome hæmorrhage.

Dr. Gross recommends the use of a flat bone-elevator to clear the coronoid process and condyle, and thus avoid danger to the artery. Mr. Christopher Heath, having employed this plan on several occasions, strongly recommends it.

Some surgeons recommend the stripping off of the periosteum in some cases ; this certainly must never be practised in the case of malignant disease of the bone.

In cases of cancer of the lower jaw, it is not infrequent for the bone to break at the angle directly the surgeon puts any pressure upon the distal end. This occurred to me in the case of M. N. The Lion forceps can, however, then be applied to the ramus of the jaw, and a good leverage obtained.

In large tumours extending up the ramus of the jaw, and implicating the coronoid process, it is often found to be most difficult to free that process from the zygomatic fossa, and dislocate the bone. Under these circumstances, it will become necessary to divide the coronoid process with the bone forceps and remove it later on, after the jaw has been disarticulated.

Sir William Fergusson recommended, in very large tumours of the lower jaw, that a long semi-circular incision should be made from the zygoma around the tumour to a point in a line with the angle of the mouth on the opposite side of the jaw, thus avoiding the division of the lip. I do not, however, see any advantage in this operation, as the wound in the lip always

heals well and leaves very little scar. Mr. Syme and Professor Humphrey removed the ramus and condyle of the jaw without opening the mouth, through an incision in front of the ear.

The whole of the lower jaw may be removed by a circular incision extending from a point over the articulation on the one side, extending downwards and below the tumour, around to a point opposite the masseter muscle on the other, stopping just short of the facial artery.

If care be taken in dissecting up the flap, this artery need not be wounded. In turning up the flap the whole of the lower lip is dissected up and drawn well upwards over the face, thus giving ample room for the operator to see what he is about, and enable him to disarticulate the bone first on one side and then on the other. If there should be much difficulty in doing this, the operation may be much expedited by dividing the jaw at the symphysis, and removing first one half and then the other.

Numerous contrivances have been invented to prevent the half of the bone which is left being drawn across by the muscles to the side from which the diseased half has been removed, in the shape of metallic caps, suggested by Nasmyth, of Edinburgh, which were so contrived as to fit the teeth in the upper and lower jaw ; Cartwright suggested a vulcanite cap with the same view ; but all of these cause so much pain, and directly they are left off the jaw is still drawn over, that I consider that it is far better to leave things alone, and allow the bone to be drawn in.

After-treatment. — The wounded surfaces should be well dusted over with iodoform, a full-sized drainage-tube introduced at the most dependent part, and a piece of protective placed over the wound, the edges of which should be brought together with silver-wire sutures about an inch apart, with a few intermediate horsehair sutures. If the lower lip has been divided, it should be united with hare-lip pins in the ordinary way. Carbolic, corrosive sublimate, or some other antiseptic gauze, should

be applied over the whole, and a soft Gamgee's pad placed over that, and a bandage lightly applied to support the parts.

The patient's mouth should be kept well irrigated with boro-glyceride lotion or a solution of Condy's fluid.

His strength should be maintained with good nutritious diet, such as beef tea, milk, eggs; and here I would express most strongly the desirability of not allowing the patient to take any food into his mouth, but that he should be fed entirely by means of the œsophageal tube, or, what I use as a substitute, a full-sized gum elastic catheter, fitted by means of a piece of india-rubber tubing, with a small funnel; the catheter can be easily passed into the œsophagus by the nurse, and liquid food administered.

If the patient is fed in the ordinary way with a feeding-cup, the milk and egg naturally gravitates into the wound, and causes much trouble, as it is most difficult to keep the mouth clean by any amount of syringing.

Should the patient's temperature rise, and any signs of septic mischief set in, large doses of quinine, three to five grains, must be given with the beef tea or food every three or four hours; by this treatment the temperature is usually soon reduced.

I do not advocate the use of stimulants in these cases unless the patient's strength is found to be failing, in which case brandy in small and repeated doses will be found of great service.

CHAPTER IV.

CANCER OF THE TONGUE.

The tongue is peculiarly liable to be the seat of cancer, which is always of the squamous-celled epithelial type, scirrhus being rarely, if ever, met with in this organ. Thus, out of 190 cases collected by me as occurring at the Cancer Hospital, only one was ascribed to scirrhus, and in this case no microscopical examination of the growth was made. I should therefore be very much inclined to think it was not scirrhus. Of 66 cases collected by Mr. Barker, from the University College Hospital Case Book, one is described as distinctly of the nature of scirrhus. All observers, however, are agreed on this point, that the tongue is liable to be attacked by epithelioma alone of all the forms of carcinoma. Sarcoma of the tongue is likewise very rarely met with. Professor Jacobi, of New York, in the "American Journal of Obstetrics" for 1870, reports a case, however, of an infant, in which the day after the child was born a tumour the size of a hazel nut was discovered. It grew somewhat rapidly, and Dr. Jacobi removed it with the galvanic écraseur when the child was two or three months old. The growth was examined microscopically, and pronounced to be one of sarcoma, being made up of tissues comprised partly of round, but chiefly of spindle cells, with but little intercellular substances.

Mr. Hutchinson contributed to the Royal Medical and Chirurgical Society, in the latter part of the session of 1884-85, a case of a medical student who had a morbid condition of the tongue from early life. The condition would appear to have

been one that may have been regarded as a congenital mole having a tendency also to a nævoid condition, in which a sarcomatous growth developed in the ordinary course of life. There was nothing except the size of the tumour to excite much alarm about it. There was no ulceration and no glandular enlargement. The removal of this very large, if not the largest, tumour of the tongue on record (weighing seven ounces) could only be effected by the division of the lower jaw and preliminary tracheotomy. The operation was successfully accomplished, and the patient enjoyed the next two years of his existence apparently in the best of health. At the end of two years the growth recurred at the cicatrix, and caused death by its rapid development. The microscopical examination proved it to be of a sarcomatous nature.

Mr. Barker and Mr. Butlin have each met with one case of lympho-sarcoma of the tongue; and Mr. Eve has recently contributed two cases to the Pathological Society.

Epithelial cancer is more frequently met with in the tongue than any other organ or part of the body excepting the uterus. Thus, in 860 cases of this disease collected from the Cancer Hospital Case Book, 190 were situated in the tongue, or at the rate of 22 per cent. The tongue also stands very high in the scale as compared with other organs affected by any form of cancer.

At the Cancer Hospital, out of a total of 2,227 cases of cancer I have collected and analyzed as occurring in patients at that hospital during the last ten years, the tongue has been the seat of the disease in 190 cases, or at the rate of 8·5 per cent.

The mammæ were attacked, the right in 315 cases, the left in 308 cases. Both breasts were the seat of the disease in 25 cases, and the breast and axilla in 49 cases, making a total of 697 cases so affected, or at the rate of 31·3 per cent.

The uterus was the seat of the disease in 274 cases, or at the rate of 12·3 per cent.

We cannot do better than compare these figures with those collected by Mr. Sibley, Sir James Paget, Von Winiwater, Mr. Morris, and Mr. Arthur Barker, and it is interesting and satisfactory to observe how nearly similar the total results of these observers are with my own. In Mr. Barker's 343 cases he noticed as many as 16·3 per cent. of cases of cancer of the tongue; whereas Mr. Sibley, in 520 cases, found the tongue affected in only 2·6 per cent.; Sir James Paget obtained a result of 6 per cent.; Von Winiwater, in 548 cases, showed a return of 8·3 per cent.; and Mr. Morris, in 501 cases, collected at Middlesex Hospital, found 7·1 per cent. In the numbers collected by all these surgeons, amounting to 2,412, we have a result of 8 per cent. of cases of cancer affecting the tongue, or only 0·5 per cent. less than those collected in my 2,227 cases.

	Dr. Sibley, 520 cases, 1853–56.	Sir J. Paget, 500 cases, 1843–61.	Von Winiwater, 348 cases, 1867–76.	Mr. A. Barker, 343 cases, 1871–81.	Mr. Morris, 501 cases, 1872–81.	Mr. Jessett, 2,227 cases, 1872–81.
Breast	36·5	55·2	32·4	36·7	51·4	31·3
Tongue	2·6	6·0	8·3	16·3	7·1	8·5

One cannot but be struck, on examining the above Tables, at the exceedingly low percentage of cases in Mr. Sibley's list, and the high rate in Mr. Barker's, whereas the percentage of cancer of the breast is the same. It is difficult to account for this, unless, as Mr. Barker suggests, many of the cases coming to University College Hospital are sent from Wales, and possibly miners may be more prone to cancer of the tongue than other people. I have been in correspondence with some of

the medical men in Wales, but have failed to obtain any confirmation of this hypothesis. It is, however, suggestive, and a point well worthy of further inquiry. This very high rate of Mr. Barker's is the more extraordinary, as we find the rates obtained by Sir James Paget, Von Winiwater, Mr. Morris, and myself practically the same.

Etiology.—It is not to be wondered at that the tongue should be a favourite seat of cancer; indeed, we can only be surprised that it is not more frequently attacked, and that the form of malignant growth should be limited to epithelial cancer. There is no organ in the body which is subjected to such rough treatment, and from its structure and surroundings one can understand how suitable a situation it must be for the growth of the disease. It has, first, what we may call its natural enemies, carious and broken teeth, whose rough, sharp edges are constantly wounding and irritating it; the large quantities of tartar which so frequently collect around the teeth (especially the back of the lower incisors) is a constant source of irritation to the tip of the tongue.

Surgeons or general practitioners cannot be too alive to these sources of evil, and recommend any patients who may consult them for ulcers or soreness of the tongue, if there be any carious teeth or collection of tartar, to go at once to the dentist to have the offending tooth or substance removed. Dentists are often too apt to cut off old, decayed teeth, leaving the diseased stumps in the jaw for the purpose of getting a better foundation for the plates. This practice cannot be too greatly deprecated, as the diseased stumps are often the foci from which spring malignant disease, and the gums are always kept in a state of constant inflammation, and apart from the danger already alluded to, the stumps become more and more absorbed, and eventually have to be removed, and then the plate is useless. Whereas, had the dentist made a clean sweep of the stumps in the first place, the gums would become hardened,

and the plate would last for years. I have seen many cases of epithelial cancer of the gums spreading to the floor of the mouth and tongue commence in this manner. Of that I am convinced.

Among the extraneous sources of irritation are false teeth, and plates which frequently fit very imperfectly, and are often, among the lower classes, made of inferior materials.

Another point I would like to mention is, that it is the practice of some people never to remove their plates and artificial teeth from their mouths, by which means the gums become spongy, foreign matter accumulates under the plate, and the plates themselves often become completely fixed with tartar deposited around them. A gentleman recently consulted me for an ulcer under his tongue. On examination I found he had had a plate fixed to his lower jaw with two incisors and some molar teeth on each side. His dentist told him not to remove it, which instruction he strictly observed, with the result that he had an epithelial cancer form under his tongue. The plate was thickly incrusted with tartar, the gums were spongy and inflamed, and altogether he was in a terrible plight. This disease was undoubtedly due to the indiscreet advice of his dentist.

Smoking is another common source of irritation, more particularly the short clay pipe, the tip of the tongue being constantly placed against, and playing with, the jagged end of the stem, causing, in the first instance, a blister or an excoriation.

Professor Ludwig has shown that carbonate of ammonia, carbolic and acetic acids, which are present in the acrid products of dry distillation of tobacco-smoke, are very injurious. The prolonged action of these substances upon the tongue often give rise to a kind of chronic superficial glossitis or icthyosis glossæ, which, as has been shown by Messrs. Clarke and Eve, may be the exciting as well as the predisposing cause of epithelioma. Burns of the tongue are very apt to become the centre or starting-point of epithelioma; so also are bites repeated

at any one spot. Ardent spirits are another cause, especially, as is too often the case, when taken neat. Hot condiments, pepper, chillies, pickles, and the like, are also pungent substances that may well be classed among the irritants of the tongue.

From these we may pass to the constitutional causes that are likely to favour the development of cancer of the tongue. Among these may be classed phthisis, syphilis, and heredity.

Phthisis.—There is no doubt in a large percentage of cases of cancer generally, and, therefore, in cancer of the tongue, the patients are at times the subjects of phthisis or have a phthisical history. We cannot, however, look at this as anything more than a coincidence, as undoubtedly there are a far larger number of people who have a phthisical history that never develop cancer. I am strongly of opinion, however, that if a patient contract a tubercular ulcer of the tongue, that such ulcer is very likely to take upon itself all the characters of epithelioma, more so, certainly, than a simple ulcer. I would, therefore, in cases of tubercular ulcer, unless it speedily heals under treatment, strongly recommend its early removal. We must not, however, on this account fall into the error, should a malignant growth follow a tubercular ulcer, that the cause of the cancer was in any way connected with the phthisical diathesis of the patient, but merely the result of the irritation of the ulcer upon a debilitated constitution.

Syphilis.—Here, again, we have a specific poison in the system; and a fairly large percentage of cases suffering from epithelioma of the tongue have a history of syphilis; but then, on the other hand, as in phthisis, there are a far larger number of people with syphilitic taint who never have any malignant ulcer of the tongue. So I think here we have no right to say that the syphilitic poison has anything whatever to do with the production of cancer of the tongue. Here, however, as in phthisis, if the tongue is affected with syphilitic ulceration or

gummata, there is a very fruitful source of irritation, which may prove a good soil for the development of cancer. Such a case was shown at the Pathological Society by Mr. Morrant Baker in a man who had been under his care at St. Bartholomew's Hospital ten years previously with syphilitic gummatous ulcer of the tongue, in which unmistakable carcinoma had formed on the scar of the former disease.

Ichthyosis is a not uncommon forerunner of cancer of the tongue; we are not, however, in a position to say that ichthyosis must necessarily be followed by cancer. I have seen, however, cancer frequently develop upon an ichthyotic patch. I have likewise often seen cancer on a tongue affected with ichthyosis, where the latter disease remained unchanged around the cancerous ulcer. We cannot say, therefore, that ichthyosis and cancer are identical, although no doubt they are pathologically very closely allied to each other, and therefore it must be looked upon as a strong predisposing cause of cancer.

Heredity.—How far heredity may be a predisposing cause of cancer of the tongue I am not at present prepared to say, for I do feel, if there is any part of the body in which the local origin of cancer may be expected, it is in the tongue; but I am certainly inclined to think that people with an hereditary tendency may be, and probably are, more prone to develop here as elsewhere cancerous ulcers from local irritations than persons who have no such tendency.

It would appear, then, that epithelioma of the tongue is connected with, or caused by, some form of local irritation, and this result may be produced without there being any hereditary taint in the system whatever; but I am strongly of opinion that where there is a family history of cancer, that an individual is much more prone to the disease than one who has no such family taint. It is true that a history of cancer in a family of any given person suffering from epithelioma of the tongue is

quite the exception. Herr von Winiwater states that inheritance is excluded in almost all his cases, while in those collected by Mr. A. Barker and Mr. Morris family taint is absent in 42 cases, doubtful in 31, and positive in only 4 cases. In the face of this, Mr. Barker says that "it would appear as though the occurrence of cancer in the families of those who have the disease in the tongue was little more than a coincidence." I do not, however, altogether agree with him, as a large number of persons who present themselves to our notice know little or nothing of their family history. They do not know what their parents died of. It may therefore be fairly argued that many cases who give no history of cancer in their families may really have such taint.

Sex.—Epithelial cancer of the tongue is very much more frequent in men than in women; in the 190 cases above referred to, 163 occurred in men, and only 27 in women; being in the proportion of seven men to every woman so affected. It may be argued that this is very likely to be the case, as men from their habits are much more likely to have their tongues injured or irritated by smoking, drinking neat spirits, or from syphilitic ulceration, than women, and, therefore, they are much more likely to contract cancer. Such is not the case, however, as the disease is found in men who do not smoke and are not addicted to taking spirituous liquors or exceed in any way, while women who are addicted to these habits do not have cancer. Cancer, moreover, may be caused, as has been already said, by the irritation of rough or carious teeth, and it can scarcely be argued that men are more liable to this form of irritation than women.

On comparing the number of cases of women affected with cancer of the tongue with men similarly attacked, collected from the Case Book at the Cancer Hospital by myself, with those reported by other observers, we find very much the same results, as the following Table will show :—

TABLE of Cases of Cancer of the Tongue, showing the Proportion of Men to Women, collected by

	Males.	Females.	Total.
Clarke, Fairlie	28	11	39
Von Winiwater	43	3	46
Barker, Arthur, University College Hospital	55	5	60
Rose	6	5	11
Paget, Sir J.	19	11	30
Morris, Henry	48	13	61
Wolfer	48	....	48
The Author, Cancer Hospital	167	23	190
Total	414	71	485

From the above Table, it will be seen that these observers have collected a total of 295 cases, of which 48 were present in women, and the remaining 247 in men, thus giving a percentage of 15·6 women and 84·4 men. This result tallies very closely to that arrived at by myself in the 190 cases collected. In these it will be seen there were 23 women and 167 men affected, giving a percentage of 13·8 women and 86·2 men.

Age plays a very prominent part in our diagnosis. If a patient over 40 presents himself to our notice with a papillomatous infiltration, no matter how limited, and there is no visible local cause of irritation, we must look with considerable suspicion upon such a nodule; and, further, if such a nodule or ulcer does not disappear or diminish in size in the course of a few days or a fortnight, we may be so certain of its character as to warrant our excising it as speedily as possible. The oldest patient I can find recorded in the Cancer Hospital, out of the 190 cases I have collected, is 79, and the youngest 32; the average age of the whole number is 52 years. In the total of 133 cases collected by Dr. Gross, he found 82 were above 50 years of age, and 51 under that age. The oldest was

78 years of age, and the youngest 29. In 58 cases collected by Mr. Whitehead, the oldest was 76, and the youngest 30.

Physical Characters.—Epithelial cancer of the tongue is met with chiefly under three forms: the one as a soft, warty excrescence; the second as a large, deep, sloughy sore, with jagged, irregular edge, and hard, indurated base; and the third as a firm, hard, dense mass, which contracts the tissues of the tongue together, and resembles dense cicatricial tissue. This latter is the form that formerly was confounded with scirrhus.

The disease commences, as a rule, in one or other of the ways to be mentioned, all of which revert, sooner or later, to a common type. In the first, a small nodule forms just beneath the epidermis—never deeply in the tongue substance; in the second, a small fissure or ulcer is the first sign of the disease, which is most difficult to distinguish from a simple ulcer, and still more so *per se* from a syphilitic or tubercular ulcer. In a third, the permanent or papillomatous form, which has no appearance of a malignant growth at first, but which speedily develops into a typical epithelioma. This form is generally on one side of the dorsum of the tongue, very far back. I had a very typical example of this form, which came under my notice some time ago, and which will be found related later on. The last form is very much less frequent, and usually associated with ichthyosis leucoplakia. It is accompanied by a general rawness of the dorsum of the tongue, with here and there indurated spots. I have only met with one case of this form of epithelioma of the tongue.

The two first forms attack chiefly the top or edges of the tongue, are much more commonly met with, and are more rapid in their progress, and the submaxillary glands become very much earlier infiltrated with the disease. The two latter are very insidious in their progress, and patients suffering in these ways often go on for some length of time without seeking advice, and when they do so the disease is often not

recognized. The lymphatic glands in these forms of disease are not affected until much later.

Thus, in 81 cases, the histories of which I have collected, the lymphatic glands in the neck and submaxillary region have been enlarged in 40 cases; of these 81 cases, 16 commenced as warty growths or nodules, 45 as ulcers or cracks, 10 as blisters or papillomatous growths, 5 as general soreness of surface of tongue, and the remaining 5 were attributed to injury to the tongue.

Of the five which commenced with a general soreness of tongue, the glands were not affected in a single instance, while in the ten attributed to blisters or papillomatous enlargement, only in one case were the glands affected, thus fully endorsing the view that epithelioma of the tongue commencing in these ways, the glands are very much more rarely affected than when the disease commences as a nodule, which speedily breaks down into an ulcer or a fissure.

This view is also endorsed by Mr. A. Baker, whose careful observations we can always so fully rely upon. Thus, he says that "out of 13 cases in which it is distinctly stated that the glands were not enlarged, 8 of the ulcers belonged to the large superficial kind, and only 3 were of the deep variety. And, on the other hand, in 42 cases in which it was noted that the glands were affected, only 11 were of the large shallow variety, while 26 were of the large deep kind, and 5 were small and deep; there being no glandular enlargement with the small shallow ulcers."

The experience of other observers fully endorses these conclusions. We may, therefore, conclude that the deeper the ulcer the more likely are the glands to be affected, and this is very important to bear in mind, as it must guide the surgeon in his advice; as, undoubtedly, the inference to be drawn is, that whereas we may in the shallow varieties give treatment a good trial without running any very great risk of placing the sufferer

in a worse condition than he was, yet in those cases which present themselves with deep ulcers the sooner they are removed the better it must be. It is only by constantly examining these ulcers that the surgeon is able to diagnose them in their early stage; yet it is of the highest importance that they should be recognized as early as possible and removed.

Seat.—In examining 81 cases which I have collected of epithelioma of the tongue, I have found the disease present on either one or other border or edge of the tongue in 55 instances, on the tip in 8, on the dorsum in 10, on the under surface or frænum in 5, and in the floor of the mouth in 3. It will be seen, therefore, how very much more frequently the edges or borders are affected than is the body of the organ. This is what one would naturally expect, for, as has been shown before, the chief cause of cancer of the tongue is constant local irritation, keeping up an inflammatory action in some one part of the organ, and the sides of the tongue are much more exposed to this source of irritation from carious and jagged teeth and from the ends of clay pipes than either the dorsum or the under surface.

	Barker.	Morris.	Author.	Total.
1. On dorsum of tongue	....	4	10	14
2. On tip of tongue	1	4	8	13
3. On edge of tongue	19	25	55	99
4. On under surface	...	1	5	6
5. On under surface and edge	1	1	....	2
6. In the substance	5	5	....	10
7. On floor of mouth and tongue	2	3	3	8
8. As a general soreness, with fixation of tongue	8	2	....	10
9. Part not mentioned	20	4	....	24
	56	49	81	186

It has been shown by some German authors, as well as by Mr. Barker, that the right side of the tongue is more frequently affected than the left; Mr. Morris, however, did not find this

the rule. In my own cases the side has often not been mentioned, therefore I am unable to corroborate or deny Mr. Barker's statement; neither do I think it at all material.

The method in which the disease commences is interesting, and here I am able to compare the initial stage of the cases collected by myself with that of Mr. Barker and Mr. Morris :—

	Barker.	Morris.	Author.	Total.
1. As a small fissure or crack ...	4	28	45	77
2. As a pimple or small tubercle	17	7	16	40
3. As a nodule or blister	7	8	10	25
4. As an ulcer spreading from the floor of the mouth	2	3	....	5
5. As an ulcer spreading from the pillars of the fauces	....	1	....	1
6. As a general soreness or feeling of rawness	8	2	5	15
7. As an ulcer spreading from a wound or injury	18	....	5	23
	56	49	81	186

It will be thus seen that nearly half of the total number of cases above referred to commenced as a fissure or crack, while in 21·5 per cent. of the cases the initial stage was attributed to a pimple or small tubercle, and 13·5 per cent. to a nodule or blister. As, however, no doubt a large number of these cases attributed to fissure or cracks really commenced as tubercles, pimples, or nodules, the percentage of the last causes of origin should be very much increased. We should therefore look with extreme suspicion on cases that present themselves over 45 years of age who have these indolent fissures, or hard nodules, and to excise such diseased parts as early as possible. The next most frequent way in which the disease commences is from an injury or cut. We must therefore look with great anxiety on any such injury to the tongue that takes on an ulcerative character.

In whatever form the disease commences it is nearly always

seated more on one side of the tongue than the other, and if left to itself will soon run into an ulcer of characteristic type, which spreads somewhat quickly into the floor of the mouth, extending to the jaws or fauces, fixing the tongue and causing exquisite pain, and from the nature of the ulcerated surface the smell is most offensive, and saliva is constantly dribbling from the mouth. The ulcer is usually very ragged, with large, reddish granulations interspersed with sloughy shreds of broken-down material with hard, indurated base. The tongue, in the more advanced stages, may be entirely or nearly eaten away, leaving a deep, filthy, sloughy, ulcerated surface, occupying the whole of the floor of the mouth. The submaxillary and sublingual glands are deeply affected, and very shortly the glands in the anterior triangle of the neck become infiltrated with the disease, even down to the clavicle. These glands are situated chiefly around the sheath of the vessels.

These conditions may be confounded with broken-down gummata, or tubercular ulcer, as has been referred to in the early part of these remarks. Gummata are, however, usually seated more in the body of the organ, are generally for some time present as a smooth elastic lump, accompanied with no ulceration, when it softens, breaks down, and forms a deep, sloughy ulcer. The history of syphilis also is a sure guide to the nature of the disease, and with appropriate anti-syphilitic treatment the ulcer soon improves.

The tubercular ulcer of the tongue is not at all commonly met with. It is as a rule seated on the back of the dorsum of the tongue, although I had a case recently under my charge with a typical ulcer situated in the left border about half-an-inch from the tip. These ulcers are most difficult to distinguish from cancer, but the edges are not so jagged, and the base not so indurated or sloughy, but has a peculiar boiled sago-like appearance.

People suffering from cancerous disease of the tongue suffer

excruciating torture, and from the extremely offensive discharge their existence is intolerable to themselves and a burden to all that are nearest and dearest to them. So much so, that they often pray to have any operation performed, in the hope, if no actual good results are obtained, at any rate their suffering may be somewhat relieved. Their general health early fails, their appetite disappears, and from the fœtid breath constantly inhaled they become more or less poisoned, and die either from exhaustion or septic pneumonia.

It is not easy to estimate the natural duration of this disease, as under different circumstances, age, strength, and capacity of endurance, must necessarily play an important part as to the time a patient may resist its exhausting influences. From six to eighteen months may, however, be taken as about the usual mean length of time in which a patient may live after the ulcer has once taken a firm hold and is not interfered with by operations. The majority will certainly die in less than a twelvemonth.

Dissemination of the disease is very rare. This, as Mr. Butlin has pointed out, is extremely uncommon where the disease is limited to the tongue. In one case, which died sixteen months after the commencement of the disease, cancerous deposits were found in the left supra-renal cavity, but in this case the microscopic character was not conclusive. Mr. Butlin mentions one or two other cases in which secondary deposits were found in the liver and rib. He examined Middlesex Hospital Reports for eight years, and from these he collected nineteen cases of patients who died from cancer or epithelioma of the tongue, either in cases unoperated on or those of recurrence. In every case the lymphatic glands were infiltrated with cancer cells. In only two of them were there secondary deposits in other organs. In one case a solitary mass, of small size, was found in the liver; in the other, many growths in the pleuræ and lungs; in the first case

the disease had existed for about one, in the latter for between two and three years. We may regard epithelioma of the tongue, therefore, as a disease which eats away the substance of the organ, extending into the neighbouring parts, and implicating the cervical and submaxillary glands, but rarely is it disseminated in other organs of the body.

This is, I think, a strong argument why, in cancer of the tongue, early and free excisions should be practised.

I have in no case seen secondary deposits in other organs of the body after death, when the primary cancer is limited to the tongue.

I look upon cancer of the tongue, therefore, as a local affection, most dangerous to life, not from its power of disseminating the disease through the body, but, by the position it occupies, preventing the sufferer from taking nourishment, and constantly poisoning his system by the fœtid saliva and discharges which are swallowed and the septic secretions which enter the lungs. He is also worn out by the constant excruciating pain, which is not limited to the diseased parts themselves, but extends to the ear, temple, and occiput, so that relief is only obtained by his being constantly kept under the influence of large doses of opium, unless, indeed, the diseased portions are removed by surgical interference or the gustatory nerve divided, as recommended by the late Mr. Hilton and Mr. Moore.

Diagnosis.—The tongue is subject to cracks and ulcers, either simple, syphilitic, tubercular, or caused by the irritation of a carious jagged tooth, an ill-fitting plate, or some foreign substance in the mouth. These ulcers and cracks are often difficult to distinguish from cancer. Hard nodules and warty growths are also frequently met with in the tongue substance which are by no means easy to diagnose, whether they are malignant, deeply-seated abscesses, or encysted growths.

Cracks and fissures occurring under the age of 30 may as a

rule be at once arranged among the non-malignant class, and will be found speedily to heal by appropriate treatment.

In the case of simple ulcers the difficulty of diagnosis is often greater than in either of the above-named forms of ulcer, as there is no history to guide one, and it is well known how frequently a simple ulcer or fissure takes on a malignant aspect. The edges are not, however, usually so deep or indurated, and the base of the ulcer is more uniform. In all cases of doubt I would recommend you to adopt Mr. Butlin's plan of scraping the ulcer and examining the *débris* under the microscope; as Mr. Butlin asserts in many cases he has succeeded in distinguishing between the malignant and tubercular or syphilitic ulcers, I think we should always adopt this method. Much, however, may be learned by inquiring into the history of the case. Syphilitic ulcers are very common, but here there is always a distinct history of syphilis, and from the other symptons of secondary syphilis, there is, as a rule, but little difficulty in arriving at a correct conclusion as to the true nature of the ulcer. If, says Mr. Butlin, the scraping from a tubercular or syphilitic, or a simple ulcer, is placed in a tiny drop of water on a glass slide and examined first with a low and then with a high power, pus and blood corpuscles are observed with *débris* of food, schistomycites, and a few normal, or almost normal, epithelial scales; if now the scrapings from a carcinomatous ulcer are substituted, highly characteristic appearances are observed. Pus and blood corpuscles, *débris* of food, and schistomycites are still present, but in addition, or, to speak more correctly, holding the most prominent place both in numbers and importance, are many epithelial scales, no longer normal, but differing in character widely from normal epithelioma of the tongue and the adjacent parts in almost every respect. The cells vary greatly in size and shape; some of them are flattened scales, others are rounded or oval, others are elongated, with truncated or long tapering ends, others again

bulge at one end and are caudate at the other end. The contents vary as much as the shape and size; the protoplasm is generally granular, often coarsely so. There may be two or three or more nuclei, and the nuclei, whether there be one or many, are much larger than those of the normal epithelioma of the tongue. The nucleoli are often as large as the natural nuclei. Mother cells are often present, and not uncommonly the cell-nest, which are so characteristic of squamous-celled carcinoma.

The ulcer caused by a jagged tooth or foreign body, often most angry looking, with deep jagged edges, very painful, easily bleeding, is generally readily distinguishable, as the source of mischief and irritation is palpable, and upon its removal the ulcer speedily heals. These ulcers, if neglected, and the cause of irritation is allowed to remain, frequently take upon themselves a malignant character. This form of neglected irritation, indeed, is, in my experience, one of the most frequent precursors of cancer of the organ. It is, therefore, most important that this should be borne in mind, and if at any time a tooth is found decayed, and presenting a sharp, rough surface, it should be at once extracted.

In all these cases a mouth wash of boro-glyceride, or chlorate of potash, is most useful in promoting healthy action in the ulcer.

Deeply-seated abscesses, or encysted tumours, are often very difficult to diagnose with certainty, until the surgeon has cut down upon them.

A case was sent me a short time since from the country. A young man, æt. 29, who had a small, hard nodule, of the size of a nut, situated in the right border of his tongue about an inch from the tip. There was much pain at times, not increased by pinching. However, no fluctuation could be distinguished. There was no external cause of irritation; in fact, it had all the appearance and feel of a scirrhous nodule. On passing a grooved needle into it, pus escaped; the abscess was then laid freely

open, and a speedy recovery followed. These abscesses, or encysted growths, usually occur in the tongue substance (more in the centre of the organ), a situation which is rarely the seat of cancer. Usually, indistinct fluctuation or elasticity can be felt in these tumours, when, by passing a grooved needle or a fine aspirating trocar into them, their true nature is discovered, and by freely opening them, as in the case above narrated, a speedy cure is effected.

Syphilitic Ulcers.—Primary syphilitic sores are occasionally met with on the tongue; I have in the course of my practice met with such on a few occasions; happily, however, this is a rare form of ulcer. When it does occur it is usually situated at the tip of the organ, whereas carcinoma more frequently occurs further back. The glands are enlarged very early, and usually secondary symptoms appear.

Tertiary syphilis, in the form of gummata on the tongue, are more difficult to distinguish, as they present many of the characteristics of that form of cancer of the tongue which appear as a lump in centre of the body of the organ. A careful inquiry into the history of the case, and the more than probable existence of some other form of syphilitic disease being present, is usually sufficient to enable a correct diagnosis to be made. Moreover, if any doubt exist, a week or ten days' treatment with anti-syphilitic remedies would, if the case were specific, effect a reduction of the gumma.

When gummata are broken down and ulcerated, the difficulty of distinguishing them from carcinoma is very much increased.

The positions of gumma are, however, nearly always in the centre of the dorsum of the tongue, whereas carcinoma is usually situated more on one side. There is often more than one gumma present, while it is rare to find more than a single carcinomatous ulcer. The base of a gumma is not so hard and indurated as cancer, and its edges are usually more undermined; the glands in gumma are not very often enlarged, while in cancer they are

always sooner or later affected. The history of the patient is often nearly conclusive, and if the case is treated with large doses of iodide of potassium, much benefit will follow.

Tubercular Ulcers I believe never exist as primary growths, but are always secondary to tubercular disease of the lungs. Thus, by a careful inquiry into the history of the patient, together with the character of the ulcers, usually the surgeon is enabled to arrive at a correct conclusion as to its nature.

These ulcers are, however, often very difficult to distinguish. Here, however, under the microscope, bacilli may be discovered which would at once settle the question. I have never seen the submaxillary or cervical glands enlarged in this class of ulcer. The history of the patient also is of the greatest possible assistance, as the following case well illustrates:—

James J——, aged 54, married; occupation, stonemason. *Family history.*—Patient states that his father was killed in a railway accident, and was, up to the time of his death, a healthy man; his grandfather, on his father's side, lived to be over 90 years of age; his mother is living and in good health, and there does not appear to be any family history either of phthisis or cancer. Patient had syphilis twenty years ago, and there is now a scar on the penis where the sore was situated. He states that the secondary symptoms, &c., were very mild. The patient states that up to the winter of 1882 he enjoyed fairly good health. About the end of November of that year he began to be troubled with a hacking cough, and as time went on he noticed that occasionally a little blood was mixed with the expectoration; he has never coughed up much blood. In January 1883 he first attended the Hospital for Consumption, and continued to attend there as an out-patient until May, when he went to Ventnor, where he stayed nine weeks. On his return to London his lung condition was better, and since that time he has never spat up any blood. At the same time that he began to attend the Hospital for Consumption

he "knocked off work," and, as he says, "had little else to do but smoke." He smoked a short clay pipe, and about the end of February or the beginning of March he first noticed a slight soreness on the left side of the tongue. This condition he put down to irritation from this pipe, and he states that he has often had small sores on his tongue in former years, due, as he believes, to smoking. He was in the habit of touching these sores with nitrate of silver, and they used to get well. He treated this last sore on the same lines, but unfortunately without the same satisfactory results. The ulcer remained small, and was treated by various applications. After his return from Ventnor his tongue was worse, and the ulcer had increased in size.

On admission into the Cancer Hospital on the 4th November, 1883, patient had an ulcer on the anterior part of the left margin of his tongue, measuring about three-quarters of an inch in length, and about half-an-inch in width at the widest part; the floor was comparatively clean, and had a rosy, slightly nodular aspect; the edges were somewhat thickened, but not irregular, everted, or undermined, but shelved down to the floor of the ulcer. There are no enlarged lymphatic glands. On examining patient's lung there was found to be marked dulness over the left apex, and also for some little way below the clavicle; there was also increased vocal resonance over the same area; breath sounds feeble, but no crepitations, and no signs of a cavity. Patient in answer to questions states that he has got considerably thinner during the past twelve months.

December 13.—Since admission the ulcer has remained more or less stationary.

Literature is, so far as I know, absolutely silent upon this disease, and, with the exception of a short notice in "Holmes' System of Surgery," by Mr. A. E. Barker, I have failed to find reference to the disease in any English text-book. A most interesting discussion, however, took place at the Pathological Society, in session 1883-84, in which I showed the case, the

history of which I have given, and cases were also shown by other surgeons.

The seat of these ulcers are chiefly at the tip or anterior border of the tongue, upon, or encroaching on the under surface, sometimes spreading over the latter.

The ulcer commences in the submucous tissue, usually as a small, hard nodule ; often there are several of these ulcers, with considerable induration of the base. The tissue is not destroyed, as a rule, very deeply. The most characteristic point about the lesion is the appearance, in most cases, of small secondary spots breaking down round the first. The edges are abrupt, deep, red, and much indurated and everted. The lymphatic glands are rarely affected, and never indurated. In the case given above the ulcer had been present for over ten months, yet there was no enlargement of any of the submaxillary or cervical glands.

These ulcers are, I believe, always secondary to deposits of tubercle in the lungs, and I am inclined to think that the ulcer is originally a simple one, and becomes tubercular by being inoculated by the bacilli in the sputa which is continually being ejected from the lungs. In the above case the man had had numerous ulcers on his tongue, but they had always healed readily until, his lung mischief increasing, one of these ulcers took upon itself a tubercular form.

If, then, a patient presents himself with an ulcer on the tip or side of the tongue, with no history of syphilis whatever, and with unmistakable signs of phthisis, I think you may suspect that such ulcer is probably tubercular.

These ulcers are very difficult to heal, and although you may considerably improve the general condition, yet the ulcer is obstinate and spreads steadily; this is the result of the bacilli which are constantly eating their way into new healthy tissues. It must not be forgotten, moreover, that tubercular ulcers are very liable to take on a malignant character. If, then, after two or three weeks' treatment, the ulcer still has a tendency to

increase, you must at once decide to remove it, and that pretty freely, so as to be clear of all deciduous tissues. The wounded surface should be kept sprinkled with iodoform, to prevent the possibility of further inoculation by the bacilli of the lung, and it will be found speedily to heal.

Warty growths are often very difficult to distinguish from cancer—the more so, perhaps, as a simple wart is known not uncommonly to pass into a cancerous growth. Here, however, if there is any doubt, the microscope should be applied; but Butlin does not rely upon this so much in cases of warty growths as he does in distinguishing ulcers. In any cases of doubt, however, I would strongly recommend that the wart be scooped out, being careful to cut well into the healthy tissue of the tongue around the wart.

Treatment.—Little, I fear, can be done medicinally for the cure of cancer of the tongue, although by the use of sedatives much relief from pain may be afforded to the patient. I have seen the most benefit derived from the free use of arsenic and phosphorus; the former, in combination with the chlorate of potash or bromide of potassium, and morphia, perhaps is attended with the best results.

℞ Liq. arsenicalis .... ℥v.
Potas. chlorat. .... gr. xv.
Potas. bromid. .... gr. xx.
Vel
Liq. morphiæ .... ʒj.
Aquæ .... ℥j.
To be taken three times a-day, at meals.

The arsenical preparations are especially applicable when the disease commences as a general soreness of the tongue, or as ichthyosis.

If the patient is anæmic, the arseniate of iron, in sixteenth-of-a-grain doses three times a-day, is to be preferred.

In cases of doubtful ulcers, it is always well to give, either by itself or in combination with Donovan's solution of arsenic.

large doses of iodide of potassium, from 5- to 10-grain doses, three or four times a-day.

The action of drugs must not be depended upon, but in a questionable ulcer, possibly syphilitic or tubercular, you should try the use of specific treatment; but do not waste more than ten days or a fortnight, at the end of which time, if the ulcer shows no disposition to heal, you must at once have recourse to operative measures, and remove the diseased part freely, being careful to cut well into the healthy tissues. And here let me lay down one hard-and-fast rule: *never on any consideration make use of caustics of any kind*, as they are utterly and absolutely useless —in fact, by their irritation, *often do harm and never any good.*

From what I have already said it will be seen that epithelioma of the tongue, if left alone, will extend, sometimes very quickly, at others more slowly, but always surely, into the whole substance of the organ and surrounding parts, and early attacking the submaxillary and cervical glands, and so surely destroying life in a comparatively short time. I, however, regard the disease as a local affection, so far as it does not, or very rarely, attack any other organ in the body; and I therefore consider, if the disease is removed early enough and thoroughly, there is little chance of its returning in the site of the cicatrix, although possibly the lymphatic glands may be already affected. This is corroborated in practice, as I have seen several cases in which a diseased mass has been freely removed, when at the end of a twelvemonth or two years there has been no return in the floor of the mouth whatever. Mr. Butlin, in his work, has recorded a number of cases where the patient was apparently perfectly free from the disease at periods varying from one to four years after the operation; and in all these cases careful microscopical examinations were made, and the disease demonstrated to be undoubted epithelial cancer.

Patients, however, very frequently seek relief for ulcers of the tongue which have all the appearance of cancer. We shall

do well, therefore, in every such case, carefully to examine and see if there is any predisposing or exciting cause of irritation to originate and prevent such an ulcer from healing. If such is found to exist it must be at once removed, and the ulcer treated with soothing washes. In such cases the surgeon will often be rewarded by seeing the ulcer heal quickly and well.

In all cases, smoking, the use of alcoholic drinks, and hot condiments must be strictly prohibited.

At present, however, we have only to deal with the question of how, with our present knowledge, we can best relieve patients who come under our care. The early removal of nodules or papillomatous infiltrations of the tongue should be insisted on as all-important, for if a nodule is removed, and is afterwards discovered to be benign or innocent in character, how much the worse is the patient for the loss of it? *Not one iota!* Whereas, if this apparently innocent nodule be left alone, it may at any moment take unto itself a malignant character.

It is unfortunately very rarely that we are able to see patients at this early stage, and when we do it is difficult to impress them with the gravity of the import of these small nodules or ulcers until the former have ulcerated, and they have both infiltrated considerably into the substance of the tongue.

The ulcerated surface is generally on one side or the other of the middle line, and I think a very important point to observe in removing the diseased portion is to excise it sufficiently widely, and another important point is to divide the tongue a little to the opposite side of the middle line to that in which the disease is situated, and remove it as far back as possible.

The stage, however, in which we most frequently meet with cases is when the disease has spread considerably into the tongue substance, and the submaxillary, and probably the cervical glands, are affected and infiltrated with the disease, and the floor of the mouth often deeply affected. The question that then arises is, Are we justified in operating at all?

Whether by removing as much as possible of the loathsome mass which is embittering the days of the unfortunate victim, torturing him probably with the most excruciating pain, preventing him taking sufficient nourishment to keep body and soul together, and at the same time slowly poisoning him by the filthy discharge. In such a case we are often sorely taxed to know what to do for the best. We know full well, if left alone, the patient will soon die a most miserable death; at the same time, we also know that we cannot by any operative measures free him of the disease. But cannot we do much to mitigate his suffering? Even in such a case as this, by freely removing the diseased parts, we often get a fairly firm cicatrix in the mouth in the place of the foul, sloughing, diseased organ; and although the disease is sure to progress in the glands that we cannot remove, yet the last days of this miserable patient may be by this means made comparatively comfortable.

Should, however, the disease have extended still further, and we decide that it is not justifiable to interfere with a view of removing any of the diseased tissues, or the patient is too exhausted from the constant discharge, inanition, and probably lung complication to undergo such a serious operation, can nothing be done to relieve him? Yes, I think so. By Hilton's or Moore's operations of dividing the gustatory nerve, and if there is hæmorrhage, of ligaturing the lingual arteries, much may be accomplished to relieve pain and suffering. It has been shown that by division of the gustatory nerve not only is the pain relieved, but the secretion of saliva is considerably diminished.

Of course, in all cases such as these, constant irrigation of the parts with weak solution of some form of antiseptic is all-essential. Subcutaneous injections of morphia will also go far to alleviate his agony.

No drug, however, has yet been discovered which has any effect in curing cancer; but if cancer is, as I believe it to be, a constitutional (I use the term here in its widest sense) and not

a purely local disease; if such is the case, the time may, and probably will, come when some drug will be discovered which will arrest, if not cure, the disease.

Only just lately, Dr. Bandeiro, surgeon to the Hospital Pedro II, in Pernambuco, Brazil, has written extolling the use of the juice of the alveloz as an external application in certain forms of epithelial cancer of the lips, nose, face, and eyelids, but not so successful in ulcerated sarcomas or carcinomas not of the epithelial variety. Some has been sent to the Cancer Hospital, Liverpool, where doubtless it will be tried, and the result reported in due course. I have received some of this preparation from Brazil, and I am now trying the effect of the drug at the Cancer Hospital, Brompton, and hope in a short time to be able to report upon the value of it.

Mortality.—Before entering into the question of operative procedure, it will be well here to inquire into the mortality after the operation of removal of the tongue, either in part or as a whole; for this purpose I have collected all the cases I can find recorded in the medical journals and from other sources, and compared them with results of 50 cases occurring in the practice of the Cancer Hospital during the years 1882-83-84, and with the observations of other authorities.

TABLE of Deaths after Operation for Removal of the Tongue from all Causes.

	Collected by Mr. A. Barker.	Collected by Dr. Gross.	Dr. Scäpher's Cases.	St. Bartholomew's Hospital, 1884.	University College Hospital.	Cancer Hospital.	Collected by the Author.	Total.
Number of cases	218	244	50	13	21	50	43	639
Died	35	56	11	2	8	8	13	133
Death-rate	16·9	22·9	22	15·38	38	16	30·2	20·7

Thus the total number of cases, amounting to 639, give a death-rate of 20·7 per cent.

From the preceding Table, it will be seen that the death-rate is somewhat high, but in this Table it must be understood that all cases are included, and many undoubtedly were operated upon simply as a palliative measure to free the patient from the loathsome disease which filled his mouth, and also to relieve the excruciating agony which many must have suffered from. Such was the case in those recorded from the Cancer Hospital; several undoubtedly died directly from the result of the operation, either from secondary hæmorrhage or septic pneumonia, the former surely a preventable cause, and the latter one which experience teaches us to escape to a much greater extent than heretofore. In dressing the raw surface, formerly I trusted entirely to washing the mouth out after the operation with a solution of permanganate of potash, or chlorate of potash; now, however, iodoform is freely sprinkled over the wounded surface, and the mouth washed repeatedly with boro-glyceride or a weak solution of carbolic acid. I formerly strictly forbade patients taking nourishment by the mouth for at least four or five days; they were fed during that period entirely with nutritive enemata, with the result that they lost strength during these few days, and therefore ran much greater risk of contracting a low form of pneumonia. Now, I invariably feed my patients at once through the stomach by means of a simple contrivance of an ordinary gum elastic catheter, to which is attached by means of a piece of elastic tubing a small funnel: this catheter is easily and without the least pain, or even discomfort, passed into the œsophagus, and beef tea, eggs whipped up in milk, conveyed readily into the stomach without coming at all into contact with the wounded floor of the mouth. This contrivance is so simple that a nurse can with ease use it after being shown once or twice; in fact, the patient after a few days passes the tube for himself. Under these improved methods of after-treatment, I have no doubt whatever that the death-rate after operations for removal of the whole or a

part of the tongue will be very much less than it hitherto has been.

Operations.—I will now pass on to describe the different operations which have been practised for removal of the tongue or a portion of the organ, and will compare the results of the operation by different methods, and then endeavour to arrive at some conclusion as to the best procedure to be adopted in different cases.

It is only of late years that surgeons have undertaken to remove any considerable portion of the tongue, and some have been surprised to find how free from danger the operation is, and how speedily and distinctly their patients speak after having lost a great part of that organ. The late Mr. Fairlie Clarke, in his work on diseases of the tongue, collected some interesting cases, in which the tongue was cut out as a punishment or had been otherwise lost. He says: "In A.D. 484, about sixty Christian confessors, of Tipasa, a mountain colony on the north coast of Africa, had their tongues cut out by order of Huzmeric, the Vandal conqueror; but within a short time some at least of them were able to speak with such distinctness that it was accounted a miracle, and it was supposed to be a signal mark of Divine favour that men who had been deprived of their tongues could still go about preaching. Even Newman, in his 'Essay on Miracles,' maintained this view: 'We find that in the Middle Ages it was no unusual thing to condemn persons who had made an unwelcome use of their speech to have their tongues cut out. The Bishop of Caithness was treated thus in A.D. 1201 for venturing to intercede with Harold for the lives of some prisoners. Again, the Ordinances of Louis IX of France condemned perjurers and blasphemers to have their tongues burnt with a red-hot iron; while Languis, of Lemberg, records that, in Germany, Italy, and Spain, similar culprits were punished by having the tip of the tongue cut off, the first step in the execution of the sentence being to nail the offending

member to a tree. The case of Pope Leo III, which is narrated by Milman, is another instance of a somewhat similar mutilation, the recovery from which came in process of time to be reckoned a miracle. I am also indebted to Mr. Twisleton for having drawn my attention to the account of some French Protestants who, in the middle of the seventeenth century, were condemned to have their tongues cut out before they were led to the stake. One of them, immediately after the operation, repeated three times, "Le nom de Dieu soit béni." In another instance the martyrs spoke so distinctly that the executioner was accused of not having carried out the sentence.'" Mr. Clarke narrates other instances of the same description, but the above are enough for the purpose of showing with what little danger the removal of the tongue is attended even when practised in the rough and ready manner by the executioner; also how little the speech is really affected by its removal.

The first case I can find of removal of the tongue by surgeons was as early as the year 1658, but it was not until the commencement of the present century, viz., 1805, that the operation was performed in any definite form, when Inglis attempted to strangulate the diseased part by means of a ligature passed round it, the ligature being kept in position by means of pins, which were made to transfer the tongue behind the disease. In 1827 Major split the tongue down the centre, and applied a ligature around the diseased half with the same object. In 1831 Jaeger suggested and practised dividing the cheek, with the view of getting more room and enabling him to get well behind the disease. In 1833 Morault introduced the preliminary ligature of the lingual artery. In 1836 Roux first introduced the division of the lower jaw and lip in the middle line. This method was afterwards adopted by Sédillot in 1844 and Syme in 1862. Then, in 1865, Langenbeck divided the lower jaw opposite the first molar tooth in order to gain free access to the side of the mouth for the removal of the

tongue glands and part of the palatal arch and tonsil. In 1838 Regnoli opened the floor of the mouth from below by an incision from the middle of the hyoid bone to the chin, ending in another semilunar incision along the border of the jaw, the tongue being drawn down through the opening and removed. Billroth modified this operation in 1871 by extending the lateral incision and uniting the central one in the middle line. In 1854 Chassaignac suggested the écraseur passing the chain through an incision above the hyoid bone, and in this year also the galvanic écraseur was used by Middledorf. In 1866 Nunnelly first adopted Chassaignac's method in this country.

In 1877 Mr. Whitehead, of Manchester, first removed the tongue by means of the scissors, tying the lingual artery as he divided it; at the same time, perfectly independently, Billroth suggested removal of the tongue by the same method, but first ligatured the lingual artery by the ordinary operation.

In 1880 Kocker adopted a method of opening the mouth from behind and below the angle of the jaw to reach the base of the tongue and remove with it the tonsil, soft palate, or any other parts that may be affected. This operation has the further advantage, that by the external incision all glands that may be affected can be removed.

Morrant Baker has lately reintroduced the plan of splitting the tongue, removing either half with the écraseur. He also places a ligature around the portion last in the loop, as he finds the lingual artery is always to be found there.

Mr. A. E. Barker, in extensive operations, suggests that tracheotomy, or laryngotomy, should always be performed before the removal, and Trendelenburg's tracheotomy tampon canula be used. He afterwards plugs the pharynx with a large sponge, with a string attached, to prevent any blood getting either into the stomach or larynx. He thinks by this method there is less risk of septic pneumonia following the operation.

In all ordinary operations the back of the mouth can be easily plugged with sponges without tracheotomy being performed.

To Chassaignac we owe the introduction of the écraseur, and it was not until this instrument was brought to the notice of the profession that surgeons dared to remove the tongue through the mouth without an external wound. It is to the relative merits of removing the tongue by this method, as compared to removal by scissors, that I wish now to draw your attention.

The operations most in vogue for removal of the tongue at present may be divided into three groups, viz., by the wire, or chain, or galvanic écraseur, either by unilateral or bilateral ablation, *i.e.*, by the knife or scissors ; and, lastly, those cases in which, from the extent of the disease, more extensive operations are required, such as Syme's, Regnoli's, or Kocker's.

To arrive at some kind of conclusion as to the best method to adopt in excision of the tongue, I have collected from the medical journals all the cases I can find reported for several years. I have also communicated with Messrs. Barwell and Gant, who advocate the use of the écraseur, with Mr. A. E. Barker, who advocates the performance of tracheotomy in many cases before removal, and with Mr. Whitehead, who was the introducer in this country of the use of the scissors. I have also collected and examined the records of the cases that have been operated on at the Cancer Hospital during the last two or three years.

The results of my investigation are not so satisfactory as I could wish, but still much may be gathered from them.

For instance, we read in one paper an account of the difficulties and dangers one operator experienced in removing the tongue by the Whitehead method. In the following week another surgeon states he has never seen any dangerous hæmorrhage arise during the operation performed in this way.

Then, again, one surgeon contends that the écraseur, either wire or galvanic, leaves a lacerated, sloughy wound, which exposes the patient to much greater risk of septic poisoning than if the organ had been removed by incision.

Professor Stokes, in his paper read at the Clinical Society in 1881, alluded to the cases operated on by Drs. Schäpher and Collis. The former surgeon, in 31 cases in which he removed the tongue by the écraseur, had only 3 deaths from septic causes, showing a percentage of only 6 per cent. of deaths; whereas, in 10 cases in which he removed the tongue by incision, he had 6 deaths from septic complication, or at the rate of 60 per cent. Dr. Collis had very similar results, as in 20 cases in which he removed the organ by the écraseur he had no deaths; whereas, in 13 cases in which he removed it by scissors, he had 8 deaths, or at the rate of 61 per cent. Mr. Barwell has furnished me with the results of his 14 cases removed by the écraseur, in which he lost none. Mr. Gant, 10 cases removed by the buccal operation and écraseur, with no deaths.

On the other hand, Billroth's experience seems to have differed considerably from that of the above-named surgeons, as he has nearly abandoned the use of the écraseur, and adopted the method of removing the tongue with scissors, ligaturing the lingual arteries first.

Mr. Whitehead has, in answer to my inquiries, furnished me with the results of his operations. He has removed the entire tongue 58 times, viz., 48 times by scissors and 10 by the galvanic écraseur. Of the 48 cases of the removal by scissors he lost 9, or at the rate of 18·7 per cent.; but he explains this apparently high mortality by the fact that he frequently operated upon very advanced and hopeless cases, at the request of the patients themselves, solely with a view to remove from the mouth a loathsome mass of disease, and with a prospect of lessening pain. He attributes the deaths of these 9 cases practically to septic poisoning.

COMPARISON of Cases removed by the Écraseur and Incision, showing the relative Mortality from the two Operations.

	Dr. Schäpher.		Dr. Collis.		Mr. Barwell.	Mr. Gant.	Mr. Whitehead.		Dr. Purcell.	Collected by the Author.		Total.	
	Écraseur.	Incision.	Écraseur.	Incision.	Écraseur.	Écraseur.	Galvanic écraseur.	Incision.	Incision.	Écraseur.	Incision.	Écraseur.	Incision.
Total number	31	10	20	13	14	10	9	48	6	21	13	105	90
Died	3	6	....	8	....	....	....	9	1	6	4	9	28
Death-rate	9	60	....	61	....	....	....	18·7	16·6	28·5	30·7	8·56	31·1

From the above Tables it will be seen that, while there were only 9 deaths after removal of the tongue in 105 cases, or at the rate of only 8·56 per cent., after removal of the organ by incision death occurred in 28 cases out of 90 operated upon, or at the rate of 31·1 per cent. One cause for the excessive mortality after removal of the tongue by the scissors may be, I think, traced to the fact, that in many cases the operation has been adopted simply as a palliative measure, and to relieve the patient of a filthy putrid mass from his mouth.

The conclusions to be drawn from the above observations are—

1. In all cases of small nodules or ulcers seen early, that do not speedily improve or disappear by treatment, should be excised as soon and as freely as possible. The best plan of doing this is undoubtedly by means of the knife or curved scissors, taking care to cut well into the healthy tissue. Should any hæmorrhage occur the cautery will usually stop it.

2. The écraseur is applicable to the class of cases in which the disease is limited to some portion of the anterior part of the tongue; and here I unhesitatingly would adopt Mr. Morrant Baker's operation of splitting the tongue down the middle and removing the diseased half by the écraseur, adopting his precaution of placing a ligature around the last part included in the wire. Should both sides be affected, I should still split the tongue and remove each part separately, as by this means you can remove the parts much further back.

3. When the tongue substance is thoroughly infiltrated with the disease extending far back, it becomes a question whether the scissors or écraseur should be used. If the latter, the plan proposed and practised by Mr. Barwell is, in my opinion, the one by which the best results may be expected, as by it undoubtedly the wire can be placed thoroughly well behind at the root of the tongue. The buccal operation also gives much more room for the application of the wire well around the

disease. But the length of time occupied in the removal, and the almost impossibility of guiding the wire so as to embrace the whole of the disease, in these cases of extensive disease, appears to me the great drawback to this plan of treatment. Messrs. Whitehead and Billroth's operations have, in this class of cases, very decided advantages, as they enable the surgeon to keep as clear of the disease as possible, and if care is taken to snip very slowly and keep the mouth well wiped out with dry sponges there is very little risk of hæmorrhage. Care should be taken when approaching the lingual arteries to be ready to seize them with clamp forceps and tie them at once.

I have seen as much, if not more, hæmorrhage during the use of the écraseur as I have during the removal by scissors. I have, however, on one or two occasions seen most violent hæmorrhage during the removal by scissors, and I found it impossible to secure the lingual at the bleeding point, and was obliged to tie the artery by external incision; another case at which I was assisting a year ago the same thing occurred, and the patient's life was in serious danger. Mr. Treves also relates a case in the "Lancet," in which he had the greatest difficulty in arresting the hæmorrhage. Under these circumstances, therefore, when the disease extends at all within the floor of the mouth, it would be always wise to adopt Billroth's method, and preface the operation by ligaturing the lingual arteries. The surgeon would then be very much more at his ease, and better able to snip away the whole of the disease. He can, by the same incision by which he ties the arteries, also remove any glands that may be affected.

Mr. Christopher Heath has done much to relieve the operator of anxiety by his excellent suggestion of drawing the stump of the tongue well forward by an assistant working his finger round the base of the tongue and pressing it well forward. By this means all hæmorrhage may be arrested until the bleeding point is secured. I have witnessed the excellent results of this

method of controlling hæmorrhage, especially when the tongue has been removed by the Whitehead method with the scissors.

A case that occurred in my practice strongly supports what Mr. Treves has met with in his experience of removing the tongue by the scissors. It was the case of a strong, powerful man, who had a fair-sized epithelial ulcer on the left side of his tongue, extending somewhat into the floor of the mouth. The man was placed in a sitting position before a good light, and the tongue split down the centre and snipped away with the scissors and quickly removed; violent hæmorrhage ensued, and the bleeding point was most difficult to find, as the tissues were all so pliable and rotten that a ligature could not hold, and I was eventually, after many futile efforts to arrest the hæmorrhage, obliged to ligature the lingual artery by external incision. The man lost a very large quantity of blood, and died a few days afterwards from septic pneumonia. I would strongly recommend in all such cases as these that the lingual artery shonld be tied first, or the operation which I am about to describe adopted.

I have practised in some cases, when the disease is not too extensive, a combination of Morrant Baker and Kocker's operations. My reason for adopting this plan is that I consider it most important that all glands, be they ever so slightly enlarged, should be removed. By making then a large external incision, as recommended by Kocker, the surgeon is enabled to enucleate all glands that come into view. Then, if the disease of the tongue is not very extensive, instead of following Kocker's operation further I remove the diseased half of the tongue by the écraseur after the plan laid down by Mr. Morrant Baker. By this means I remove all glands and the diseased portion of the tongue without opening the floor of the mouth, which I think is very important to avoid if possible. Should the disease be more extensive, and there should be some difficulty in removing the diseased portion of the tongue by the écraseur, I

should extend my external operation and tie the lingual arteries, and afterwards remove the tongue with scissors. A case illustrative of the advantages of this operation came under my care some short time ago.

Case.—A man, ætat 45, presented himself with an ulcer on the right side of his tongue the size of a shilling; the tissues of the organ anent were deeply infiltrated, and the disease extended rather far back, about in a line with the foramen cæcum. The glands in the neck were extensively diseased. I made in this case a long incision, extending from just above the angle of the jaw to nearly the middle line or point. I had no difficulty in removing all the glands. The floor of the mouth being quite free, I determined to split the tongue down the middle and remove the diseased half by means of the wire écraseur, which was done without difficulty. The wound in the neck and the floor of the mouth speedily healed, and in a comparatively short time he left the hospital.

The surgeons who advocate the removal of the tongue by the scissors claim for this method the following advantages, viz., rapidity of removal, greater precision in removing all the affected parts, and a lesser risk of septic mischief after the operations. The first two points I think they have clearly established, but I cannot find any proof of this operation having been more free from septic mischief than those cases in which the organ has been removed by the écraseur.

Their claim to rapidity and precision in removal I consider are two most important points, and points which must have great weight with most, if not all, surgeons in deciding upon the course they should adopt in any given case. If the patient is low and emaciated, is it wise to keep him for so long a time under an anæsthetic, as is requisite to remove the organ by the écraseur? The advocates of this method no doubt will answer at once, "Yes!" And for this reason: that by this method no blood need be lost. Granted, but I contend by means of

removal by the scissors very little blood need be lost if care is taken to snip very slowly and take up the lingual artery directly it is divided, and at the same time, you can be very much more sure of removing the whole of the disease.

It is impossible, or well-nigh impossible, in a tongue that is thoroughly infiltrated, to guide the wire of the écraseur, by whatever method may be adopted, so as to be sure that the whole, or as much as is possible to be removed, is removed. Moreover, if Billroth's method is adopted, the whole of the diseased portion may be snipped away without any fear of hæmorrhage.

Mr. Barker, in a very able paper read before the Pathological Society, advocated very strongly the advisability of performing tracheotomy in all cases where the whole of the tongue has to be removed in such cases as I am at present discussing. In this, however, I differ with him. I think it is subjecting the patient to an extra operation without an adequate compensation in any way for the extra expenditure of strength and vital power.

If, as I have earlier suggested, the tube with sponge connected be introduced into the pharynx, or well to the back of the tongue, there is little fear of any blood trickling into the larynx during the operation; and if the floor of the mouth is treated, as he has advised, by plugging it with gauze soaked in spirit and well dusted with iodoform, I cannot see that there is very much risk of septic poisoning afterwards.

Should the disease extend not only into the tongue substance, but also infiltrate the floor of the mouth deeply, then if an operation is to do any good at all it must be done as thoroughly as possible. In such cases, undoubtedly, the operation of splitting the jaw in the middle, as first suggested by Roux and Sédillot in 1836 and 1844, but perfected by Syme in 1862, or Langenbeck's operation, of dividing the jaw at the first molar tooth, are the best—in fact, the only ones that give any hope of clearing the disease from the mouth.

4. Where the disease implicates the whole of the floor of

the mouth, and the gums, the tonsils, and the submaxillary glands are affected, then the only operations which can be expected to remove the disease are either Sédillot's, Regnoli's, or Kocker's, and in some cases, when the disease has not extended to the cervical glands, either one or the other of these operations may be performed. Here, again, much discussion has arisen as to the best method of removing the diseased parts after they are separated from the jaw and drawn down through the opening. For myself I think it matters very little; undoubtedly with the scissors the surgeon is better able to remove the disease more thoroughly, but in all these cases it is well-nigh impossible to remove it all. I should prefer the scissors, as the parts can be much more quickly removed, and any bleeding parts are then easily taken up and secured.

A man was admitted into the Cancer Hospital with a hard mass of disease quite at the back of the tongue, extending into the floor of the mouth and implicating the pillar of the fauces, tonsils, and pharynx; he had many enlarged cervical glands. He suffered intense pain, and had much difficulty in swallowing. After a consultation with my colleagues it was decided to endeavour to remove the disease by Kocker's operation. The disease extended so near the external carotid and internal maxillary arteries that it was deemed advisable in the first place to ligature the common carotid, which was done by extending the upper incision downwards, along the anterior border of the sterno-mastoid. On removing some of the glands the superior thyroid and facial veins were found to be enormously dilated, and it was necessary to divide them. On putting a ligature on to the proximal end the tissues gave way, and it being so close to the internal jugular vein, it was deemed unsafe to leave a ligature so near to such a large and important artery, so I decided upon placing a ligature around it above and below and dividing it. Having cleared away all the glands and

snipped out the diseased tissues as far as I could find them, I opened the floor of the mouth, and having split the tongue down the centre as far back as the epiglottis, proceeded to snip out with scissors the floor of the mouth, half of the tongue, tonsil, pillars of the fauces on the same side, and a portion of the pharynx. The wound was thoroughly drained with two large tubes, and the patient fed from the time of the operation by means of a gum elastic catheter and funnel. His temperature kept very high for some days, but he eventually made a thoroughly good recovery, and six months after the operation there was no return of the disease.

Lastly, in those classes of cases which present themselves in which the disease has progressed so far as to render any operative procedure for the removal of the organ impracticable and useless. Can we do nothing to mitigate the sufferings of the patient? I think much may be done for him by adopting the method by the late Mr. Charles Moore and also by Mr. Hilton. They suggested the division of the lingual nerve where it lies behind the last molar tooth and immediately beneath the mucosa, and in some cases ligatured the lingual arteries. There is no doubt in cases where excessive pain and profuse salivation are among the most prominent symptoms, section of the nerve may be practised with great benefit to the patient. I think it advisable, if possible, to remove a piece of the nerve, as this would prevent any possibility of its reunion. The division of the nerve not only gives instant relief to the intense pain experienced by the patient, but it also gives him great comfort by preventing the secretion of saliva.

Operations.—The operations proposed have for their object, then—

First, to relieve the suffering of the patient or to retard the growth of the disease. For the former, Mr. Hilton, some time ago, suggested the division of the gustatory nerve, and for the latter, the lingual artery may be ligatured.

Seeondly, extirpation of the disease, with a view to a radical cure and prolonging life. For this, as has been shown, numerous operations have been proposed. As they all have for their object the same end, I shall only describe those operations which are now most commonly practised, viz.: (1) removal of the organ by means of the scissors, as suggested by Whitehead and Billroth; (2) removal by the écraseur, either galvanic or wire; (3) Sédillot's or Syme's procedure of splitting the lower jaw in the middle line; (4) Kocker's operation of removing the tongue and floor of the mouth by an incision made below the angle of the jaw; and, lastly, Regnoli's submental operation.

Palliative Operations.—Division of the gustatory nerve was introduced by Hilton, with a view of alleviating the suffering caused by cancer. Mr. Moore adopted this method in several cases with marked comfort to the patient on whom he operated. The division of this nerve has a further recommendation, as it decreased the flow of saliva, which is always a great source of annoyance to patients suffering from cancerous disease of the tongue.

The nerve may be divided in two ways, but the simplest method is to remember that the nerve lies under the mucous membrane of the floor of the mouth, just opposite the second molar tooth. Here it can be most easily divided by dividing the mucous membrane in this situation covering it, when the nerve will be found lying just behind the sublingual gland. It should be raised on a blunt hook and a quarter of an inch of the nerve removed. In cases where the disease extends to the floor of the mouth it is sometimes difficult to find the nerve in this situation, in which case the positions suggested and practised by Moore are to be preferred. He took as his guide a line drawn from the centre of the crown of the last molar tooth to the angle of the jaw; this line will cross the nerve at the exact spot where it should be divided. The nerve lies about half-an-inch from the tooth, between it and the anterior pillar of the fauces,

parallel to but behind and below the bulging alveolar ridge, which can be felt in the jaw ascending towards the coronoid process. By entering the point of the knife, therefore, into the mucous membrane three-quarters of an inch behind and below the last molar tooth, and cutting down to the bone, the nerve must be divided. Moore advised that a curved bistoury should be used for this purpose, to avoid the projecting alveolar ridge.

The relief experienced by the patient is instantaneous, the pain suddenly disappearing along the whole of the parts supplied by the nerve.

Ligature of the lingual artery has been proposed with a view of arresting the progress of the disease by cutting off the blood supply to the parts. I have never seen any good result from this operation, and therefore cannot recommend its adoption for this purpose.

It is well, however, in removing the tongue, often to ligature the artery as a preliminary measure, as it enables the surgeon to take his time in removing the tongue in extensive disease of the organ.

The artery is best reached by a curved incision extending from the symphysis menti, reaching downwards as low as the hyoid bone, and prolonged upwards nearly to the angle of the jaw. The skin, cellular tissues, and platysma being divided, and all bleeding points clamped as the dissection proceeds, the flap is drawn up by an assistant. The central tendon of the digastric muscle and the submaxillary gland are now exposed; the latter should be drawn upwards, and the tendon of the digastric downwards, by blunt hooks. The posterior edge of the mylo-hyoides should be defined, and the hypoglossal nerve, with a branch of the lingual vein, will be seen passing beneath its posterior border, lying horizontally upon the hyo-glossus muscle. These structures being drawn up out of the way, the surgeon proceeds to divide a few fibres of the hyo-glossus transversely about an

eighth of an inch above the great corner of the hyoid bone, when the artery will be at once exposed. An aneurism needle, armed with silk or catgut, should be passed round it from above downwards, and the artery secured.

Operations for complete or partial Extirpation of the Tongue.

The operations suggested by Whitehead and Billroth are identically the same, with the exception that Billroth first secures the lingual arteries as above described.

Whitehead's operation is conducted after the following simple manner :—

1. The mouth is opened to the full extent with Mason's or any other suitable gag, the duty of attending to this important part of the operation being intrusted to one of the two assistants required.

2. The tongue is drawn out of the mouth by a double ligature passed through its substance an inch from the tip. This ligature is given in charge of the second assistant, with instructions to maintain throughout the operation a steady traction outwards and upwards.

3. The operator commences by dividing all the attachments of the tongue to the jaw and to the pillars of the fauces, after the manner suggested by Sir James Paget, with an ordinary pair of straight scissors.

4. The muscles attached to the base of the tongue are then cut across by a series of successive short snips of the scissors until the entire tongue is separated on the plane of the inferior border of the lower jaw, and as far back as the safety of the epiglottis will permit.

5. The lingual or any other arteries requiring torsion are twisted or ligatured as divided. It is generally found that a moment's pressure with a small piece of sponge, held in sponge forceps, suffices temporarily, if not permanently, to arrest any bleeding; it is, however, regarded as desirable to twist or

ligature, either immediately, or after the tongue is removed, every bleeding vessel.

6. A single loop of silk is passed by a long needle through the remains of the glosso-epiglotiddean fold of mucous membrane, as a means of drawing forward the floor of the mouth should secondary hæmorrhage take place. This ligature may with safety be removed the day after the operation, and, as it is invariably a source of annoyance to the patient, it is always desirable to adopt this rule.

The after-treatment should be such as I shall describe later on.

Mr. Barwell, at the Clinical Society, in March 1881, showed a patient in whom he had adopted the method of excising the tongue by the écraseur. The description of the operation, as suggested by him, is the following:—

An incision, about one-third of an inch long, just in front of the hyoid bone, exposed the raphé of the mylo-hyoid, which, being divided, bared the edge of the genio-hyo-glossus; these muscles, separated with the handle of the scalpel, enabled the operator to feel the base of the tongue and the deep surface of the buccal mucous membrane. A Liston's needle passed into the wound entered the mouth just behind the left last molar tooth, the thread being left. The same was done on the right side, the loop of the cord being in the mouth. To the first cord the end of an écraseur wire (to be described immediately) was tied, and so drawn into the mouth; its end, being freed from the first thread, was hooked into the loop of the second, and drawn round the back of the tongue, out of the wound, and fastened to the écraseur. A Liston's needle was then passed into the wound through the middle of the tongue, and, guided by the operator's finger, was made to emerge well behind the disease. This needle guided the wire as it was tightened along the required line. As soon as the back of the tongue was thus severed, another écraseur was placed behind the incisor teeth,

and its loop pressed well down in the previous section. Thus the tongue was freed from the floor of the mouth, and taken out from between the lips.

Mr. Barwell said of his method that, if the écraseur were slowly used, it was almost bloodless, left no mutilation, and that he could remove the tongue from immediately in front of the epiglottis with as much ease as the tip. Moreover, as the sensory nerves of the organ were divided close to the jaw, the patient suffers hardly any pain afterwards, as exemplified by this case.

Dr. Purcell has adopted a somewhat similar method to this at the Cancer Hospital, but, instead of using the wire écraseur, he has adopted the galvanic wire. I have removed the tongue by this method with good results, and consider, where the disease is seated quite at the base of the organ, and implicating more or less the whole of its substance and encroaching on to the floor of the mouth, that this is the best method to adopt.

Mr. Morrant Baker's Operation.—By this method, after the introduction of a suitable gag and the removal of any sharp or jagged teeth which might be in the way of the operator, two threads are passed through the tongue about an inch behind the tip and half-an-inch on each side of the middle line. The tongue being now drawn forwards and upwards, the frænum and, as far as it may seem necessary, some of the muscular attachments of the tongue to the lower jaw in front are now snipped through with strong, rather curved, blunt-pointed scissors, and the scissors are then "run" along the floor of the mouth at the side, beneath the mucous membrane, as far back as may seem requisite, keeping close to the lower jaw, both for the avoidance of hæmorrhage and for the sake of being clear of the disease. The operator now with his forefinger clears the tongue in front and at the sides, and, drawing it well forward again and giving one thread to his assistant while he holds the other himself, he cuts steadily along the middle line of the

tongue from the tip backwards, and farthest along the mucous membrane. On the withdrawal of the knife the finger is now again introduced, and it will be found quite easy to complete with it the median division of the tongue by a little tearing or splitting between the two halves. The only part which cannot be thus torn is the mucous membrane of the dorsum. Hence the advice just given to divide this with the knife as far as may seem necessary for getting beyond the level of the disease. The écraseur is now slipped over the diseased half of the tongue; the assistant turning the screw while the operator keeps the loop as far behind the disease as possible. This is, of course, one of the most important parts of the operation; any want of care at this stage being shown afterwards by the narrow margin of healthy tissue, or by none at all, left attached to the diseased mass. The insertion of curved needles behind the disease, in order to insure the division by the écraseur of healthy tissue, is often advisable, but, for the reasons previously given, must not be considered a sufficient safeguard in the absence of free separation of the tongue's attachments in front and at the sides.

The écraseur employed should be one curved "on the flat," and a strand of twisted wire or strong whipcord will be found more serviceable than the linked chain, which, from working only in one plane, or nearly so, is much less readily looped far back.

In all cases in which, from the extent of the disease backward, or in the floor of the mouth, any difficulty is anticipated in placing the loop of the écraseur well beyond the tumour, the cheek may be divided with advantage by an incision extending from the front border of the masseter to the angle of the mouth. This measure, indeed, though not uncommon, is, I am inclined to believe, much less frequently adopted than it might be, especially in cases in which the cancerous affection has invaded the floor of the mouth.

If combined with division of the frænum, and as much of the muscular structures which tether the tongue in front as may be safely divided, and if, at the same time, the mucous membrane of the floor of the mouth be cut through, so as to form a sound boundary-line for division in this direction, I have found that division of the tongue along its middle line is an excellent preliminary measure, not only in operations for removal of half the tongue, but of the whole organ also. The two halves are more completely under control than the tongue as a whole, and by working with two écraseurs simultaneously no time will be lost.

It sometimes happens, and especially when wire or whip-cord is used instead of the jointed chain, that the portion of the tongue which has been noosed is not completely severed, even when the écraseur has been screwed up to the hilt; and this is much more likely to happen when the part of the tongue which is being divided is healthy than when the loop has been placed only just beyond, or not beyond, the diseased tissue. In the latter case, the comparatively hard and brittle cancerous structure is easily crushed through; while, on the other hand, the soft and yielding healthy tissue is partly crushed through and partly squeezed up into a fine pedicle, which is pulled through the aperture at the end of the écraseur through which the cord works. The matter may be, of course, remedied when too great a length of wire has been allowed, by reversing the screw and retying the chain or cord; but a better plan in many cases is simply to put a ligature round the pedicle beyond the loop of the écraseur, and cut off the severed half of the tongue forthwith—a simple procedure, which saves many minutes and affords the operator the satisfaction of knowing that he probably has the principal vessel ligatured, instead of lying merely crushed on the face of the stump. In the same way, too, the time occupied in the tightening of the écraseur-loop may be often advantageously shortened, a ligature being applied so soon

as the tongue-tissue has been squeezed up (of course slowly) to the dimensions of a small pedicle.

Excision of the tongue by division of the lower jaw, or Sédillot's operation, consists of dividing the lower lip in the middle line by a vertical incision extending from the lip across the chin to the hyoid bone; the jaw is then sawn through at the symphysis. Sédillot recommended that, instead of sawing through the bone in a straight line, two oblique cuts should be made, meeting in the centre, thus >, so as to form a triangle, and allow the opposite sides of the bone being locked more firmly together after removal of the tongue. This is not, however, at all necessary; but it is well, before dividing the bone, to drill two holes on each side of the median line directly opposite to each other, so that on bringing the bone together the wire may approximate the ends quite evenly.

The jaw having been sawn through, the surgeon proceeds with scissors to snip the mucous membrane and muscles connecting it with the tongue, keeping the scissors quite close to the jaw, the two sides of which are drawn apart; the tongue is then removed from the hyoid bone by a stroke of the knife. The lingual arteries and all other bleeding points must be secured by clamp forceps and ligatured. The removal of the tongue from its base may, however, be accomplished with less loss of blood by using the wire or galvanic écraseur; in fact, by this method scarcely a drop of blood need be lost.

A stout silk or whipcord ligature should be passed through the stump, brought out of the mouth, and fastened to the forehead of the patient by means of a piece of sticking-plaister, for the double object of preventing the stump from falling back and causing dyspnœa, also of affording a means of drawing the stump forward in case of any secondary hæmorrhage.

The opposite sides of the jaw must now be brought together, and fixed by means of stout silver wire, and the lower lip united with hare-lip pins in the usual way, a few interrupted horsehair

or wire sutures being placed in the wound below the jaw. The after-treatment must be the same as recommended for the other operations.

Kocker's Operation.—In this operation Kocker performs preliminary tracheotomy, and introduces Trendelenburg's canula, which is most convenient for the administration of the anæsthetic. He then passes a large sponge, soaked in a weak solution of carbolic acid, well into the pharynx, with a strong piece of silk or whipcord attached; by this means all risk of blood trickling into the larynx or being swallowed is avoided. A long curved incision is then made, extending from the symphysis menti to the hyoid bone in front, and continued from thence to a point about the centre of the sterno-mastoid muscle, and upwards along the anterior edge of that muscle to a point a little below the tip of the ear; the flap thus formed is turned up on to the cheek, and the facial and lingual vessels secured. The deep tissues being now divided to the full extent of the wound, and all bleeding stopped and vessels ligatured, the submaxillary fossa is completely cleaned out, and the lymphatic, submaxillary, and sublingual glands removed before the floor of the mouth is opened. The chief hæmorrhage in this part of the dissection will be caused by the division of the facial artery and vein, and the anterior and external jugular veins; by careful dissection, however, these may be always seen before dividing them, and ligatured in two places, dividing the vessels between the two points. The next step is to place a gag in the mouth, and with scissors divide the mucous membrane and tissues in the floor of the mouth, having first passed a stout ligature through the tip of the tongue. Care will have to be taken, unless both lingual arteries are tied in the preliminary stage, to catch the vessel on the side opposite to the incision, when divided, and ligature it at once. The floor of the mouth being now opened, the surgeon passes the silk ligature through the opening in the floor of the mouth, and draws the tongue into

the wound beneath the jaw, pulling it through the opening; he then proceeds to remove either the part or the whole by the scissors, galvano-cautery, or wire écraseur.

This being done, and all bleeding points secured, any enlarged glands must be removed. In ordinary cases the wound may be brought together by a few wire sutures and intervening horsehair sutures. A large drainage-tube should be inserted into the most dependent part of the wound, and the whole dusted with iodoform powder.

If the operation is extensive, Kocker prefers to leave the wound open. He directs that the tracheotomy canula should be left in as usual after tracheotomy. In order that the wound shall not be infiltrated with the discharges, the skin flaps are fixed back with sutures, and the entire cavity from the entrance of the wound right back to the mouth and pharynx is plugged with a tampoon of sponge or gauze well soaked in a five per cent. solution of carbolic acid. But before this strong solution is applied to the wound, the tampoon should be washed over with water.

The patient is to be fed chiefly when the dressings are changed, but he may also be fed by the rectum. The whole operation and dressings are done under the spray.

Regnoli's operation of removing the tongue through the floor of the mouth is performed by making a vertical incision from the symphysis menti to the hyoid bone, and from the distal end of this incision carrying two other curved incisions on either side of it, running along the border of the inferior maxilla to the anterior edge of the masseter muscle, so as to avoid wounding the facial vessels; the skin, cellular tissue, and platysma are then to be dissected back so as to expose the lingual muscles. The insertion of the genio-hyoid and genio-hyo-glossal muscles and the mucous membrane of the floor of the mouth are next divided, a bistoury being passed then into the mouth; the anterior insertion of the digastric and mylo-hyoides

muscles and mucous membrane are divided as far as the anterior pillars of the fauces, and all bleeding points secured. The tip of the tongue is then drawn down through the wound so that it lies on the front of the neck, and the organ removed either by the scissors or the écraseur.

A modification of this is the operation originally suggested by Chassaignac and Nunnelly, and modified again later, as already described, by Barwell and Purcell.

In some cases in which the floor of the mouth is affected well in front, extending into the substance of the jaw, necessitating the removal of a portion of that bone, the operation suggested by Sédillot and Syme is necessary, and a portion of the jaw may be removed by the same operation. Case VIII, referred to in the Appendix, is such a case, in which the symphysis was entirely removed, as well as the floor of the mouth and tongue.

Removal of Lymphatic Glands.—If, as usually happens, the lymphatic glands are affected, it is well to excise them at the time of removing the disease in the tongue. They may usually be easily enucleated by an incision made directly over the enlarged glands. Often, however, the tissues in the neighbourhood are infiltrated, and thickened by chronic inflammation extending around the diseased gland, and frequently the sheaths of the vessels are implicated, in which case it is well-nigh impossible to remove them without injury to the vessels and nerves. In such cases it would be far wiser not to attempt the operation.

The removal of small ulcers or warty growths, if seen early, may be accomplished by seizing the growth with a pair of Vulsellum or artery forceps, and snipping them out with scissors, care being taken to cut deeply into healthy tissue.

In all operations for the removal of the tongue or portions of the tongue, the mouth should be well gagged open with a suitable gag, and undoubtedly the one best adapted for the purpose is that suggested by Whitehead and named after him.

Death after removal of the tongue is most frequently caused by septic pneumonia, the result of absorption of septic matter derived from the wound, or from hæmorrhage during the operation, the blood getting into the bronchi and setting up irritation there.

Secondary hæmorrhage is a not uncommon cause of death, but may follow the removal of the tongue by the écraseur or incision. If care, however, is taken at the time of the operation to secure all the vessels, I do not think secondary hæmorrhage need be much dreaded. Should such an occurrence take place, the surgeon should clear the clot out and search for the bleeding point and secure it by a ligature. If, however, as sometimes is the case, this is impossible, a pellet of iron lint may be applied, and pressure maintained; should the hæmorrhage still continue, it will be wiser at once to ligature the lingual or carotid artery.

The Treatment of the Wound after Operation.—It was not until quite recently that surgeons troubled much about the treatment of the wounded surface after the removal of the tongue; they contented themselves by keeping the wound well syringed out several times a-day with some antiseptic fluid—chlorate or permanganate of potash, or weak solution of carbolic acid—and feeding the patient with nutritive enemata for a few days after the operation, so as to keep the mouth as clean as possible.

German surgeons have of late, however, paid great attention to this point, and it is to Woelfler, Kocker, and Billroth we owe much for drawing attention to the subject. The method of dressing the wound adopted by Billroth in his clinic, as suggested by Woelfler, is as follows:—He takes 6 metres of gauze, thoroughly cleansed of all fatty matter, and soaks them in a mixture of glycerine and colophony dissolved in alcohol (60 gr. glycerine and 100 gr. colophony dissolved in 1,200 gr. 94 per cent. of alcohol); then squeezed and powdered in the half-dry state, with about 50 gr. of iodoform powder.

From this strips are cut about the width of two or three fingers, and are placed in the cavity in the mouth with a pair of forceps; all the angles of the wound are filled with it without exercising any undue pressure, but so as to cover the whole surface of the wound.

The gauze thus introduced interlaces with the surface of the wound, and forms a firm dressing which cannot be displaced without producing hæmorrhage. This dressing may remain for six or eight days without being removed, at the end of which time granulation will have commenced, the plug becomes loosened, and can then easily be taken out. The advantage claimed for this form of dressing is that the patient may be fed by the mouth in the usual way the day after the operation, without fear of irritating the wound in any way; and the drainage which is usually necessary can be dispensed with.

I have adopted this method in two or three cases in which I have removed the tongue, and must confess I have not found it come up to my expectations.

The treatment I adopt is, after all hæmorrhage is arrested, to thoroughly dust the wounded surface over with iodoform; if an opening has been made in the floor of the mouth—that is, if Kocker's operation has been performed, or the tongue has been removed by the écraseur through an opening in the floor of the mouth—I invariably utilize this for free drainage with a full-sized drainage tube. The cavity of the mouth is syringed out twice or thrice a-day with a solution of Condy's fluid, and then the whole surface again dusted over with iodoform.

The patient is fed from the first with the œsophageal catheter with funnel; this is easily passed by the nurse, and without pain or inconvenience to the patient. By this means the patient's strength is well maintained; and I have, since I adopted this plan of treatment, had excellent results from my operations, as also have my colleagues, who now nearly always adopt this plan of treatment.

Fig. VIII.

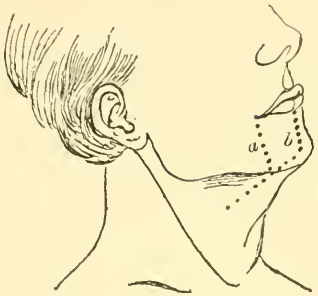


Fig. IX.

Fig. VIII.—The dotted line represents the incision to be made in Kocker's operation for the removal of the tongue.

Fig. IX.—The dotted line (*a*) represents the incision in Langenbeck's method of section of the jaw opposite the first molar tooth.

The dotted line (*b*) represents the incision for removal of the tongue, after section of the jaw in the middle line, as adopted in Roux's, Sédillot's, and Syme's method.

TABLE of Cases collected from the Medical Journals,

No.	Name, Age, Occupation.	Family History of Cancer.	Date, Character, and Manner of Commencement of the Disease, and when first noticed.
1	Jane A., 47, F.	None	Growth on right side of tongue commenced April 1873; one year previous to admission noticed first a small nodule, size of a pea; at present of considerable size, but smooth and condylomatous in appearance. Constitutional remedies tried, and irritating stumps of teeth removed. Extended from one inch from the tip backwards to within a quarter of an inch of base. In front approaches to within a quarter of an inch of middle line
2	J. H., 52, M., labourer	None	Front of tongue and extensive infiltration of sublingual tissues
3	E. S., 61, F.	None	Tumour, size of small chestnut, and tolerably firm, situated behind the middle of the right edge of tongue, not encroaching upon either dorsum or under surface. The surface has a granular appearance, and the growth overhangs the contiguous surface of tongue. No glandular enlargement. First noticed a small pimple on right side of tongue six months ago
4	J. D., 62, M.....	None	Sore on right side of tongue about one inch long and three-quarters of an inch wide. Tissue around hard and indurated. About a year ago noticed a pimple at side of tongue; commenced to ulcerate ten weeks ago. No pain; does not smoke; no bad teeth

Reports of Societies, and the Cancer Hospital Case Books.

Ichthyosis present.	Date and Character of the Operation.	Result.	Date and Cause of Death.	No.
None	The tongue was removed by splitting it down the middle line, and the diseased half excised close to its attachments to the hyoid bone. The patient was fed by means of a gum-elastic feeding tube passed by the nostril and allowed to remain	Was quite well one year after the operation	....	1
None	Divided lip and skin down to the hyoid bone in the middle line, sawing through jaw on each side of symphysis, and removing the tongue and subjacent soft parts with galvanic écraseur	Made a good recovery. Jaw firmly united	....	2
None	Removed by wire écraseur	Made a good recovery	....	3
None	Removed by wire écraseur	Made a good recovery	....	4

No.	Name, Age, Occupation.	Family History of Cancer.	Date, Character, and Manner of Commencement of the Disease, and when first noticed.
5	J. S., 55, M., labourer	None	Sore on floor of mouth, which extended forwards as far as symphysis of jaw. The parts were hard and fixed. The front teeth were bad and irregular, and more or less loose. On left side large glandular swelling in submaxillary region, the size of a pigeon's egg. About six months ago noticed soreness of floor of the mouth. At first no hardness, but after two or three months noticed a lump, which increased in size, and then his lower teeth became loose. Has been a great smoker; short clay pipe
6	T. H., 66, M., policeman	None	On right side of tongue is an ulcerated mass about half-an-inch long, raised somewhat above the surface of tongue, and nearly filling the mouth. The tissues around are hard, extending to left side. Severe pain; no hæmorrhage; unable to swallow solids. Seven weeks before noticed increased flow of saliva and pain in tongue, accompanied by swelling on left side. A week later it became hard and grew rapidly, and three weeks ago it commenced to ulcerate. No smoker; no syphilis; toothless
7	A. B., 49, M.....	None	Ulcer situated on one side of tongue; no glandular enlargement. Smoker
8	F. J., 55, M., labourer	None	Large ulcer on side of tongue, implicating the floor of mouth. First noticed a pimple on side of tongue nine months ago, which ulcerated about six months later. Submaxillary land enlarged; teeth jagged

Ichthyosis present.	Date and Character of the Operation.	Result.	Date and Cause of Death.	No.
None	Lip divided to hyoid bone. Jaw cut through on each side of symphysis by chain saw ; the glands were dissected out by extending the incision, and the tongue removed by wire écraseur	Made a good recovery	....	5
None	The frænum and deep tissues in floor of the mouth were divided with scissors, also the anterior pillars of fauces. A vertical incision, three-quarters of an inch long, was made in the median line just above the hyoid bone, and the loop of a wire écraseur passed into mouth and slipped over back of tongue close to epiglottis, and the tongue thus removed	Made a good recovery	....	6
None	Tongue slit down middle, and disease removed by wire écraseur	Made a good recovery	....	7
None	Removed by Syme's operation	....	Died of septic pneumonia a fortnight after operation	8

No.	Name, Age, Occupation.	Family History of Cancer.	Date, Character, and Manner of Commencement of the Disease, and when first noticed.
9	E. P., 74, M., sailor	None	Large ulcer, very similar to last case. The ulcer has been coming for the last ten months. Great smoker; short clay pipe
10	J. S., 58, M.	None	Ulcer on under surface of tongue, encroaching on frænum and floor of mouth. First noticed it eighteen months ago, when it was cauterized. Glands enlarged
11	W. E., 49, M.	None	Large ulcer implicated the whole of one side of tongue and floor of mouth. Has been coming on for the last twelve months
12	E. L., 26, M.....	None	Ulcer implicating top of tongue and floor of mouth. First noticed soreness seven months since
13	E. S., 37, F.	None	Ulcer deep on left side of tongue raised, and tissues around hard; increased rapidly to level of last molar tooth. No glandular enlargement. First noticed a fissure in tongue three years ago
14	W. B., 64, M....	None	Large ulcer, about one inch behind the top of tongue, situated on the upper surface; tissue around hard. Base of ulcer deeply excavated, and covered with greyish slough. Glands enlarged. No great smoker
15	D. C., 45, M.....	None	Extensive ulceration of whole tongue, and enlargement of glands at the angle of jaw. Very bad teeth

Ichthyosis present.	Date and Character of the Operation.	Result.	Date and Cause of Death.	No.
None	Removed by Syme's operation, tracheotomy being performed as a preliminary, and Trendelenburg's tampons and tubes used	....	Died of septic pneumonia	9
None	Removed by Syme's operation	....	Died of septic pneumonia	10
None	Removed by Syme's operation. Tracheotomy performed. Mouth drained with silver tube	Made a good recovery	....	11
None	Removed by Syme's operation. Tracheotomy performed. Mouth drained with silver tube	Made a good recovery	....	12
None	The tongue was split down the middle, and the diseased half removed by wire écraseur	....	Died with diphtheritic exudation in trachea and bronchi	13
None	Tongue split down the centre, and diseased half removed by wire écraseur	Recovered	....	14
None	Tongue split down centre, and diseased half removed by wire écraseur	....	Died of septic pneumonia, third day	15

No.	Name, Age, Occupation.	Family History of Cancer.	Date, Character, and Manner of Commencement of the Disease, and when first noticed.
16	G. D., 64, M., clerk	None	Ulcer on right side of tongue, extending along the whole side of tongue. Induration passes far back, but does not extend much into the floor of the mouth. No glandular enlargement. Commenced as a small lump six months previously. Attributes it to rough, jagged teeth
17	G. S., 44, M.....	None	Recurrence of disease in right side of tongue. The disease had been removed nearly four years previously. The disease recurred in the scar
18	N. W., 50, M.	None	Large ulcerated mass extending along right side of tongue. Glands at angle of jaw enlarged. First noticed a pimple eight months previously
19	E. D., 56, M.....	None	A foul ulcer, involving left side of tongue and floor of mouth, and extending to lower jaw. No glandular enlargement. First noticed a sore place below tongue three months ago on left side; this has gradually increased in size
20	T. P., 45, M., butcher	None	Large ulcer extending along the left border of tongue from near the tip to the last molar tooth. Edges raised and everted. Glands in submaxillary region much enlarged. First noticed small sore on left side of tongue six months ago, which has increased very rapidly
21	J. H., 52, M., shoemaker	None	An irregularly oval, cancerous ulcer, with raised edges and hardened base, is situated about the middle of left edge of tongue. A small gland beneath jaw on left side. Noticed a sore spot on left side of tongue about ten weeks ago, which has gradually increased in size

Ichthyosis present.	Date and Character of the Operation.	Result.	Date and Cause of Death.	No.
....	Tongue split down centre, and diseased half removed by wire écraseur	Made a good recovery	....	16
None	The whole tongue removed in two halves with scissors	Recovered, but glandular enlargement took place shortly after operation	....	17
None	Whole tongue and glands removed	Made a good recovery. Nine months afterwards glands in neck became affected	....	18
None	Removed the whole tongue. The left cheek was divided from the angle of mouth to the masseter muscle. The tongue was split and removed by écraseur	Made a good recovery	....	19
None	The tongue was split, and removed by wire écraseur	Made a good recovery	....	20
None	Whole tongue removed in two halves. When the tongue had been almost crushed through by the écraseur, a ligature was placed around	Made a good recovery	....	21

No.	Name, Age, Occupation.	Family History of Cancer.	Date, Character, and Manner of Commencement of the Disease, and when first noticed.
21			
22	J. A., 60, M.....	....	Ulcer on side of tongue, which extended rapidly as far back as the foramen cæcum, involving whole organ. Had a small lump seven months ago, which had been twice removed by ligature
23	J. S., 58, M.	....	Ulcer of large size, which bleeds freely, situated on left side of tongue. Attributes it to jagged teeth. Has been a great smoker. Noticed first as a small sore eighteen months ago
24	J. B., 69, M.....	....	Ulcer situated at centre of right side of tongue. Noticed it first eleven months ago
25	B. D., 40, F.	....	Large excavated ulcer on tongue, the size of date, with hardened edges, bleeding on slightest touch. No glands. First noticed blister on tongue eighteen months ago; about two months since observed a spot on left side
26	G. W., 50, M.	....	Large ulcer, surrounded by deep infiltration, occupying the right half of tongue. Glands. Noticed a brownish spot on tongue about nine months previously. No bad teeth. Smoker
27	E. H., 34, M.	....	The tongue ulcerated over the right side for greater part of extent, with hardened base. There is also a hardened nodule on left side of tongue. Nodule first noticed on right side of tongue three months before admission
28	A. B., 61, M.....	None	Extensive ulceration of tongue. No glandular enlargement. Five years ago burnt his tongue with a hot clay pipe

Ichthyosis present.	Date and Character of the Operation.	Result.	Date and Cause of Death.	No.
	the remainder to secure the lingual artery			21
....	Removed by écraseur through small opening above hyoid bone, as recommended by Barwell	Made a good recovery	...	22
....	Tongue removed by écraseur after dividing the cheek, as recommended by Gant	Made a good recovery	....	23
....	Removed by wire écraseur through submental opening	Made a good recovery	....	24
....	The mucous membrane of floor of mouth freely divided round lower jaw with scissors, and tongue removed by passing the wire of the écraseur round	Recovered. The disease returned in a year	Died one year after operation	25
....	The same operation as the previous case	Recovered. Disease recurred in five months	....	26
....	Cheek divided to masseter muscle, and tongue removed by écraseur	Recovered	....	27
None	Frænum, floor of mouth, and anterior pillars of fauces divided with Paquelin's cautery, and tongue removed with écraseur	....	Died of septic pneumonia ten days after	28

No.	Name, Age, Occupation.	Family History of Cancer.	Date, Character, and Manner of Commencement of the Disease, and when first noticed.
29	J. M., 59, M.....	None	Ulceration of tongue, extending to floor of mouth. First noticed an ulcer six months previously
30	T. H., 56, M.....	Grandfather died of cancer of jaw	Ulcer occupying right middle third of tongue, ulceration with deep induration. First felt lump on tongue five months ago. Attributed to bad teeth and smoking short clay pipe
31	M. K., 50, M.	....	Deep, dirty fissure on left side of tongue; commenced as a crack about six months previously. Bad teeth; great smoker; hard drinker
32	A. B., 53, M.....	....	Large ulcerated mass on left side of tongue, implicating the floor of the mouth. Glands much affected. First noticed five months previously
33	G. D., 42, M.....	....	Indurated fœtid ulceration, occupying greater part of the floor of the mouth on left side, extending back as far as last molar tooth; on right side to lesser extent, closely adherent to inner surface of jaw and surface of tongue. First noticed five months previously. Ascribed to a pipe with dirty brass mouthpiece
34	J. T., 44, M.....	....	Ulceration of right margin of tongue, as far back as the palatal glossal fold. Foul ulcer, an inch and a half long. Due to jagged teeth. Enlarged glands
35	W. P., 48, M....	....	Ulcer involving nearly the whole tongue, worse on left side. Commenced as an indurated spot on left side of tongue several months previously. No local cause

Ichthyosis present.	Date and Character of the Operation.	Result.	Date and Cause of Death.	No.
None	Frænum, &c., divided with scissors, and tongue excised with wire écraseur. Lingual artery bled freely	....	Died of septicæmia seven days after operation	29
None	Whole tongue removed with scissors (Whitehead)	Recovered well....	....	30
None	Whole tongue removed with scissors (Whitehead). Severe hæmorrhage, difficult to control	....	Died of pyæmia on sixth day	31
None	Whole tongue removed with scissors (Whitehead). Hæmorrhage difficult to control	Made a good recovery	....	32
None	Lower lip and jaw divided as in Syme's operation, and the soft parts cut away with scissors ; the tongue and soft parts being removed by wire écraseur; the stump secured with ligature	Recovered well....	....	33
None	Half of tongue removed by scissors (Whitehead). Hæmorrhage	....	Died septic pneumonia on third day	34
None	Removed with scissors (Whitehead operation)	Recovered well....	....	35

No.	Name, Age, Occupation.	Family History of Cancer.	Date, Character, and Manner of Commencement of the Disease, and when first noticed.
36	C. F., 49, M.....	....	A long valley-shaped ulcerated fissure, occupying the middle and posterior third on left side; also numerous patches of ichthyosis. Glands enlarged. Caused by a pipe being broken in the mouth twenty-eight years previously. Had always been sore off and on since
37	G. F., 57, M.....	....	Ulcer about one inch and a half long, chiefly in middle of tongue; bleeds freely. Glands affected. Sore first noticed twenty years previously
38	F. J., 53, M.....	....	Ulcer involving whole centre of tongue. Commenced two months ago
39	E. G., 45, M.....	....	Ulceration very extensive on left side of tongue. First noticed four months previously
40	B. A., 58, M.....	....	Right half of tongue and floor of mouth extensively ulcerated; posterior limits could not be distinguished
41	F. B., 56, M.....	....	Dorsum of tongue extensively affected. No glands. First noticed sore four months
42	W. H., 45, M., grocer	....	Ulceration extended on right side of tongue as far back as the epiglottis. Floor of mouth implicated. Glands enlarged. Has had extensive hæmorrhage
43	A. R., 49, M....	None	Ulcer extending along left edge of tongue, extending on to dorsum, about size of a shilling. No glandular enlargement. Teeth very foul. First noticed some ulceration on left side six months previously

Ichthyosis present.	Date and Character of the Operation.	Result.	Date and Cause of Death.	No.
Yes	Removed with scissors (Whitehead's operation)	Recovered	....	36
None	Removed with scissors, as above	Recovered	....	37
None	Removed with scissors (Billroth's operation). The lingual ligatured as a preliminary step	Recovered	....	38
None	Removed with scissors (Billroth's operation)	Recovered	....	39
....	Removed with scissors (Billroth's operation)	Recovered	....	40
None	Removed with scissors (Billroth's operation)	....	Died of pneumonia on sixth day	41
None	Disease too far advanced to admit of being removed. The carotid ligatured for the hæmorrhage	....	Patient improved after operation, and died fifth month later of exhaustion	42
None	Tongue removed by galvanic écraseur	Recovered	....	43

No.	Name, Age, Occupation.	Family History of Cancer.	Date, Character, and Manner of Commencement of the Disease, and when first noticed.
44	S. N., 48, M. ...	None	Cicatricial-looking nodule on left side of tongue, extending to tip, and about size of small bean. No glandular enlargement. Had had small blisters on tongue for several years
45	T. S., 67, M.....	None	Ulcer, size of a shilling, on left side of tongue, jagged edges, and hard, indurated base. Fifteen months ago cut his tongue with a jagged instrument; wound never healed properly
46	J. D., 59, M.....	None	Deep irregular ulcer along right side and tip of tongue. Submaxillary glands much enlarged on right side. First noticed a small ulcer on right side of tongue eight weeks ago
47	W. C., 50, M....	None	Ulcer, with hard indurated edges, on tip of tongue, extending back along the left margin for about one inch and a half. No enlarged glands. Two months ago cut his tongue against a sharp tooth. Caustic was applied
48	J. C., 43, M....	None	Small ulcer on right edge, and hardness of adjoining tissues; some soreness about angle of mouth. Nine months ago first noticed tongue sore. Submaxillary glands since become affected. Smoker
49	W. G., 53, M.	None	Large ulcer eating into tongue, extending to the base of the organ. Two enlarged glands. First noticed, eight months ago, ulcer on left side, caused by jagged tooth. Smoker
50	A. K., 73, M.....	None	Ulcer on left side of tongue, which commenced five years ago with a warty growth

Ichthyosis present.	Date and Character of the Operation.	Result.	Date and Cause of Death.	No.
None	Tongue removed with knife. Troublesome hæmorrhage. Left lingual had to be ligatured	Recovered	....	44
None	Left half of tongue removed with curved scissors	Recovered	....	45
None	Tongue removed with scissors. Free hæmorrhage from linguals; controlled by ligatures	Recovered	....	46
None	Tongue removed with scissors	Recovered ...	....	47
None	Tongue split down the middle, and half tongue removed with scissors	Recovered	....	48
None	Half tongue removed with scissors. Extensive hæmorrhage	Recovered from operation, but disease had returned	....	49
None	Tongue removed with knife. Very troublesome hæmorrhage. Actual cautery applied	Recovered	....	50

No.	Name, Age, Occupation.	Family History of Cancer.	Date, Character, and Manner of Commencement of the Disease, and when first noticed.
51	W. B., 32, M.	None	Deep ulcer, size of a threepenny piece, on right side of tongue. Commenced three weeks ago with small hard nodule. Hard smoker
52	M. S., 57, M....	None	A vascular growth, readily bleeding, about the size of a large walnut, on the right side of tongue; floor of mouth indurated. No enlarged glands. Commenced two years ago as a wart under right side
53	J. P., 57, M....	None	Ulcer implicating the whole tongue, and extending to floor of mouth. No glands. Commenced as a small ulcer on tip of tongue
54	G. R., 55, M.....	None	Tongue irregularly eaten away, chiefly at tip and left side. The dorsum is also covered with white ichthyostic fur. No enlarged glands. First noticed, six months ago, a small spot on left edge of tongue, which has continued to increase. Great smoker

Ichthyosis present.	Date and Character of the Operation	Result.	Date and Cause of Death.	No.
None	Tongue removed with scissors	Recovered. Disease returned in tongue and glands of neck five months after	....	51
None	Half tongue removed by galvanic écraseur. Hæmorrhage considerable, and difficult to stop	Recovered. Secondary hæmorrhage took place, and the carotid was tied	....	52
None	Half tongue removed, and Paquelin cautery applied freely to floor of mouth	Recovered	....	53
Yes	Tongue removed with Galvanic écraseur	Recovered	....	54

CHAPTER V.

CANCER OF THE TONSIL.

MALIGNANT growths of the tonsil as a primary disease are comparatively rare; indeed, Mr. Butlin in his search has only succeeded in finding twelve cases; nine of these were round-celled sarcomata; one spheroidal-celled, and two squamous-celled carcinomata. Of these twelve cases, three only are recorded by English surgeons, viz., two cases of round-celled sarcomata in the Pathological Society's Transactions, vols. xxiv and xxix, and one in St. Bartholomew's Hospital Report, 1877.

Lately, however, two cases have come under my observation; and Mr. A. Barker tells me he has had three cases recently under his charge; and Mr. Marcus Beck removed a sarcomatous growth from the tonsil of an elderly female a short time since; and at a recent discussion at the Clinical Society several cases were mentioned; so that I am inclined to think the disease is not so uncommon as is generally supposed; indeed, from the structure of the tonsil, one might well understand that it should be a favourite seat for sarcomata.

Of the three forms of malignant disease found in the tonsil, spheroidal-celled epithelioma is the least commonly met with; they have their origin in the glands situated in the submucous tissue.

Sarcomata are always met with as distinct prominent tumours of the round-celled variety, always encapsuled, and easily shelling out when operated upon. They grow most rapidly, and if allowed to go on their course unchecked speedily assume a large size. The sympathetic glands in the neck

are affected, in nearly every instance, very early in the disease, often appearing within a few weeks of the commencement of the attack.

This form of disease may attack people of any age; thus, in the cases of Mr. Butlin, the ages varied from 17 to 53; in Mr. Barker's they were all elderly; and in two cases that have come under my own observation one was 23 and the other 55 years of age.

Carcinomata, as the sarcomata, commence in the form of distinct tumours when occurring as a primary growth; they, however, very quickly break down into a deep foul ulcer, which spreads rapidly, infiltrating the surrounding tissues. The lymphatic glands in the neck are early affected, and speedily suppurate. These growths are chiefly met with in old people, and are very vascular, patients often dying quite suddenly from hæmorrhage.

Dissemination in sarcomatous disease of this part is, I believe, extremely common; in all the cases recorded, where examinations were made after death, tumours were found in different organs of the body.

Sarcomata are readily removed; and perhaps the best method to adopt is the following: the mouth being fixed open with a gag, and the tongue and buccal mucous membrane protected with bone spatulæ, the tissues over the tumour are to be divided by means of Paquelin's red-hot knife down to the tumour; then, with the finger or the handle of a scalpel, the growth is readily enucleated. By removing the disease in this way there is little or no hæmorrhage, and the disagreeable choking that would accompany the removal by means of the knife, from the blood trickling into the trachea, is avoided. In some cases the galvano-cautery wire may be placed round the disease, which is then removed. When the tumour is very large, and a tedious operation anticipated, it is well to perform preliminary tracheotomy, and passing a sponge attached to a string into

the pharynx; in this case the removal may be accomplished either with the thermo-cautery or scalpel.

Carcinoma as a secondary growth is most common, the disease extending from the tongue, palate, or œsophagus; when occurring in this form it is perfectly hopeless to attempt its removal by any operative procedure. The treatment can be only palliative, mouth washes of antiseptic lotion, boro-glyceride, Condy's fluid, &c. In cases where pain is the predominating symptom, morphia or other sedatives must be administered freely.

The diet must be soft and nutritious, as any hard substances are swallowed with the utmost difficulty, and cause infinite suffering. Should the disease extend so as to threaten to close the passage, œsophagotomy or gastrostomy should be performed to save the patient the misery of dying from starvation.

In a case recently under the care of my colleague Mr. Hayward, much relief was given by performing gastrostomy and tracheotomy; although in this case life probably was not prolonged; yet the condition of the patient was much improved, and she died in comparative comfort.

CHAPTER VI.

CANCER OF PHARYNX AND ŒSOPHAGUS.

Epithelioma and scirrhus are practically the only forms of malignant disease that are met with in the œsophagus; as, although a few isolated cases of sarcoma and colloid cancer have been recorded, they are so few as almost to be unworthy of notice.

One case of sarcoma is quoted by Mr. Butlin. It is reported by Dr. Chapman in the "American Journal of Medical Sciences," vol. cxlviii, p. 433. I cannot do better than quote the abstract of the case as I find it reported:—*

"A Mr. M——, æt. 45, died some eight or nine months after the first appearance of symptoms indicative of stricture of the œsophagus. They had not differed in any way, so far as was observed, from those attending any form of malignant stricture; but after death the walls of the inlet of the canal were greatly thickened, and perforated at one point by a small orifice which led into the interior of an oval tumour lying to the right side of the œsophagus, and having generally an alveolar build. Whether this was an enlarged gland does not seem to have been certain, but below it, and still to the right side of the œsophagus, lay another tumour, of whose glandular origin no doubt was entertained. Microscopical examination of the walls of the œsophagus where they were thickest showed that the epithelial layer was wanting, that the corium was transformed into a tissue partly of round and partly spindle cells, and that the submucous layer was composed

* Butlin: "Sarcoma and Carcinoma," p. 160.

of a dense mass of spindle cells forming alveoli filled with large oval cells. The glands had a similar structure."

This case, so far as I am able to discover, stands by itself, as I have not been able to find another case reported since.

The form of cancer found in the œsophagus is usually of the squamous-celled variety of epithelioma, occasionally the cylindrical form, and, rarely, scirrhus. Thus, in 59 cases collected by Mr. Butlin, 54 are classed as squamous-celled epithelioma, 4 as spheroidal-celled (hard and soft), and 1 colloid. In the 60 cases collected by myself, 46 were attributed to epithelioma and 10 to scirrhus. It will thus be seen that, in 115 cases, 14 were attributed to scirrhus cancer, or 12·3 per cent., while the remaining 87·7 per cent. were of the epitheliomatous type.

Men here, as in epithelioma of the tongue, are much more frequently attacked than women; thus, in the 59 cases referred to by Mr. Butlin, 47 were men, while only 12 were women. So, likewise, in the cases collected by myself, there were 13 women affected in the 60 cases collected.

The situation of the disease in the cases collected by me is not very definitely mentioned; but, so far as I could ascertain, the upper third of the tract was attacked in 12 cases, the middle in 23, and the lower in 12; in two cases the seat was not mentioned. This does not agree with the experience of other observers; and no doubt the reason is to be found not so much in reality, but in the manner cases are reported. Thus, in many of my own cases, the seat of disease has not been definitely fixed as occurring in either third, but has usually been described in connection with the anatomical relation to adjoining parts; so that no doubt many cases which I have classified as occurring in the middle third may really have involved a portion of the upper and middle in some cases, and in others the middle and lower thirds.

Dr. Norman Moore, in 12 cases he collected, found the disease situated in 6 cases in the lower end, in the middle in 5.

Morrell Mackenzie contends that the upper third was the seat of disease in nearly half his cases; while Ziemssen, on the contrary, thinks the lower half is more frequently affected.

Then, again, the disease is often found to extend over such a large extent of the tract that it is very difficult, if not impossible, to determine the exact spot at which it commenced.

Thus, if the canal were divided into halves instead of thirds, I agree with Mr. Butlin the number of cases affecting each half would in all probability be very nearly equal.

In only 6 of the 60 cases was ulceration absent. The character of the ulceration is similar to that found elsewhere; the edges jagged and irregular, usually everted, the surface presenting a gnawed, uneven appearance, and coated with flocculent discharge. The surrounding parts are indurated, and often, if not always, infiltrated with the disease. In 16 cases the glands in posterior mediastinum were affected and impregnated with the disease.

As the growth progresses it spreads rapidly, ulcerating into neighbouring parts. Thus, in the 60 cases referred to, the thoracic aorta was perforated in 6, the patients dying quite suddenly from hæmorrhage.

The trachea was eaten into in only two cases, although undoubtedly it is more frequently attacked than this would lead one to suppose. The lungs, bronchi, and pericardium were also invaded by the disease in several cases, as will be seen by referring to the Table. The bronchial glands, I believe, are very much more frequently affected than is generally supposed; but dissemination into other organs is rarely met with. Dr. Norman Moore found the lungs the seat of secondary deposit in four cases out of twelve, and ulceration into the large vessels in two.

Age plays an important part in the diagnosis. The average age of the cases here reported is 49·24 years; sixteen were over 60, and twenty-two between 50 and 60, while there is not one under 30. If, then, a patient complains of the symptoms to be

presently described, any or all of them, and he is over 50 years of age, you may fairly suspect malignant disease; and if there be no history of the sufferer having swallowed any corrosive liquid, or having had syphilitic ulceration, you may be quite sure he is suffering from cancer.

Among the diseases that may be mistaken for carcinomatous disease of the œsophagus are spasmodic strictures, and simple strictures, following chronic inflammation, leading to hypertrophy and induration of the walls of the tube; or from contraction occurring in cicatrization of an ulcerated surface, the result of old burns, caused by swallowing boiling liquids, or some corrosive compounds, either strong acids or caustic alkalies. The former is usually met with in young hysterical women, is of sudden appearance, and is usually traced to mental causes or adjacent irritation, and is always accompanied by nervous and hysterical symptoms. This form can be easily distinguished by the passage of an œsophageal tube, the patient being placed under the influence of an anæsthetic. The latter forms of stricture are often much more difficult to diagnose, and in these cases not infrequently the recurrent laryngeal nerves become involved in the disease, causing aphonia, due to paralysis of the vocal chords. In these cases most distressing symptoms, followed by speedy death, may result, owing to foreign substances getting into the trachea and air passages, dependent upon the inability of closing the glottis.

Origin.—The manner in which the disease commences is said to be by the formation of plaques, nodules, ulcers, or fissures, as in other parts. Zenker and Ziemssen, who have written upon this point, say the disease commences sometimes in an island-shaped plaque, and sometimes in the form of a girdle; but the facilities for determining the true method are so few, that I think we can only judge of the manner of origin by analogy, and I should be inclined to favour the idea that the

disease commenced much in the same manner as we see it do in the tongue, lip, or mucous membrane of the mouth. Our opportunities of studying this point, as well as which surface of the canal is most frequently affected, are necessarily limited to the post-mortem room; and, as has before been observed, the disease progresses so rapidly, and spreads over so large an extent of the tract, that it is impossible to decide where it commenced in a very large majority of the cases.

Duration.—The length of time a patient may live when affected with this disease must necessarily depend upon a variety of circumstances. Thus, the average length of life of forty-nine cases in which the duration of the disease is mentioned, so far as one is able to determine, was only a trifle over eight months, from the time when the patient first complained of any pain, discomfort, or difficulty in swallowing; but this, quite possibly, is much under the mark of the real time, as there can be no doubt that many patients have the commencement of the disease present without any symptoms arising to cause them to notice discomfort or pain. The causes that would affect the length of life after the disease is established are many and manifold. For instance, when the growth ulcerates into the aorta or any large blood-vessel, life will be cut very suddenly short; so, likewise, if the disease extend into the bronchi or the lungs, death will be considerably accelerated. Should the pneugastric or recurrent-laryngeal nerves be involved, then again dissolution will be hastened. The longest time a patient was known to live after the disease was recognized, in the Tables reported by me, was fifteen months, while in Mr. Butlin's cases sixteen months was the extreme period noticed. The earliest death mentioned in my list is three months. In this case, as also in another which lived only four months, the cause of death is attributed to hæmorrhage from ulceration into the aorta.

The majority of cases, if left alone, no doubt die from exhaustion due to inanition and continued pain. In twenty-

three of my cases gastrostomy was performed, with marked benefit so far as pain was concerned, in most, if not in all, the cases operated upon. Whether life was actually prolonged by the operation I think is open to doubt, and will form a subject for consideration when discussing the treatment of the disease.

Predisposing Causes of the disease are difficult to assign, but here, I think, we may fairly judge by analogy of other parts; and I have very little doubt that the habit of taking very hot substances or pungent sauces, such as chilies, mustard, &c., in large quantities, may, by constant irritation in a subject predisposed to the disease, form a class of causes which may excite the disease. So, again, old cicatrices, either from burns or syphilitic ulceration, may constitute a very likely starting-point for malignant growths.

Dissemination.—Secondary deposits do not commonly form in distant organs of the body when the disease is situated in the œsophagus. Thus, the liver was the seat of cancerous deposit in only two, the left pyramid of the thyroid body in one, the lungs in four, the spleen in one, the heart in one, and the stomach in two, out of my sixty cases; while, in Mr. Butlin's fifty-nine, the liver was affected in three cases, the kidneys in two, the pancreas and stomach in one. In most of these cases, where dissemination of the disease takes place in distant organs, I think the primary disease is nearly always scirrhus. Thus, in the two cases in which secondary deposits were found in the liver as recorded above by me, the original growth was reported as being scirrhus cancer.

The bronchial and neighbouring glands are noticed as being affected in only ten cases; but I cannot help thinking that they are the seat of secondary disease in a far larger proportion of cases than this, as we know how very rarely the glands are found to be unaffected in cancer of the tongue, lips, breast, or, indeed, any other part, and it is scarcely conceivable they should escape here. In Mr. Butlin's cases they were found to be

diseased in fifteen cases. The glands usually affected are those lying in the immediate neighbourhood of the disease; yet sometimes it happens, as pointed out by Gussenbauer, that those glands lying at a distance almost remote from the disease are first and solely attacked.

That dissemination of the disease is a rare occurrence, then, I think there can be no doubt; but often one finds a number of nodules in the mucous and submucous tissues of the œsophagus, sometimes above and sometimes below the original disease, often invading the whole of the œsophageal tract even as high as the tongue, which have been found by microscopical examination to be epitheliomatous. It has been suggested that these secondary growths are carried as germs by means of the blood and lymphatic vessels situated in the walls of the œsophagus; but Mr. Butlin not being aware of any lymphatic vessels disposed thus longitudinally along the œsophagus, and considering the evidence not sufficient to support this theory of transmission through the blood-vessels, and further, he not being in favour of their being separate growths of the primary disease, says: "It seems more probable that they are the result of continuous extension of the primary disease beneath the mucous membrane, not in a thin and widely extended layer, but rather in the form of fine ends or lines which here and there break forth in more exuberant growth." Now, I am very much more disposed to favour the theory of the extension of the disease by means of the blood-vessels, not by the means suggested of germs being carried along the tract, but, as the more recent research of Schüppel and Feltz, who have shown reason for believing that cancer cells may penetrate directly into the capillary vessels either by perforation of the capillary wall, or, following Cohnheim and Maas, by the actual migration of the cancer cells; this latter mode, as Nepveu argues, though difficult to prove or refute, is most probable. In another theory, published some years ago by Legros, the statement is made that the vascular epithelia in

cases of cancer of the breast were much larger than normal. Since 1872 Nepveu has made many observations to the same effect, and further, he has noticed proliferation of the epithelia lining the small veins and capillaries in apparently healthy tissues situated at some distance from the morbid focus. As to the frequency with which this occurs, Nepveu states that he has no certain data. He names this form of dissemination "*endophlebitis cancerosa*." I think this method of the disease being disseminated along the œsophagus is the most probable, and one that recommends itself to my mind far before that suggested of its extension beneath the mucous membrane. To account for the extension of the growth through the lungs, it certainly is not difficult to understand that the disease having ulcerated into one of the bronchi or trachea, the cancer cells are easily conveyed by the simple act of inspiration deeply into the lung substance to the air-cells, and I think the fact that often only one lung is affected, frequently at only one spot, and that most commonly in the right lung, favours this view.

Symptoms.—The symptoms of all forms of malignant disease of the œsophagus are pretty much the same, excepting, perhaps, that scirrhus cancer is of slower growth than squamous epithelial cancer, but for all purposes of diagnosis and treatment they are practically identical.

Formation of cancerous matter in this region is commonly preceded by pyrosis, hiccough, and transient pains in the fauces. Suddenly developed dysphagia is, however, frequently the first sign of its existence. Undoubtedly, many patients have malignant disease developed some time before any symptom occurs, and constantly the first intimation is the fact that one day they find they cannot swallow a piece of solid food without difficulty, and often it is returned. They more frequently for some little time have a burning sensation when the food passes down the œsophagus, and the passage of any solid is accompanied with pain. Symptoms from this time succeed

quickly, and shortly the patient finds he can swallow nothing but liquids. In some cases the œsophagus forms a tumour from dilatation of the canal above the disease, which fills with the food and forms a tumour perceptible externally, and this has actually been mistaken for an enlarged thyroid gland.

Paralysis of the vocal chords, either singly or both, is a most frequent symptom of malignant disease of the œsophagus, and when coupled with the other symptoms is most conclusive as to the true character of the case, as it is scarcely ever present in other forms of stricture.

If the stricture affect the upper part of the canal, the greater portion of each mouthful of food at once regurgitates; if the lower, then a few mouthfuls pass easily as far as the stricture, and the accumulated matter is then gently expelled by the action of the muscular fibres. These occurrences are at first only occasional, a circumstance which tends in some cases to keep alive the hope that the patient is suffering from spasmodic stricture only. But the dysphagia eventually becomes permanent; it may be attended in addition with spasmodic contraction of the pharynx, accompanied by great dyspnœa and cough; should the disease open into the trachea or a bronchus, violent coughing and threatened suffocation will often attend every act of swallowing food. Sometimes a dilated pouch forms above the obstruction; here the food may accumulate and is rejected, commonly with the greatest effort, sometimes without either pain or effort.

The ingesta accumulated in the œsophageal pouch are never perhaps wholly rejected. The patient is even sometimes conscious of the slow filtration of some portion of them through the constricted part into the stomach.

I am inclined to think that the cases of stricture of the œsophagus other than traumatic or malignant are of very rare occurrence.

Polypus of the œsophagus may give rise to many of the

symptoms of stricture; thus, in a case related by Dr. James, "British Medical Journal," vol. ii, 1878, p. 832, he relates a case where a patient, a lady, suffered from a polypus which entirely precluded her from taking food; this, like one related in the same volume by Mr. Annandale, was easily relieved; the one case by puncturing the tumour, which evacuated a quantity of gluey mucus, and in the other by removal of the polyp. In both these cases the tumour was seen by the patient, and the chance of mistaking them for stricture was very slight.

Diagnosis.—One very important aid to diagnosis, both as to the nature of the stricture, whether organic or spasmodic, is to be found in auscultation. In a very valuable paper read at the meeting of the British Medical Association in 1875, Mackenzie pointed out how necessary it was in all cases of dysphagia to examine the œsophageal tract by means of the stethoscope.

That this method is not commonly practised is proved, I think, by the fact that I do not know any text-book in medicine or surgery that describes it as a means of diagnosis.

The plan adopted varies in different cases, and it would be well for any one who wishes to adopt it, to practise in the first place upon a known healthy individual. The patient having taken a mouthful of water, the operator places the stethoscope first upon the trachea anywhere between the hyoid bone and the supraclavicular fossa. The patient then is told to swallow, when a very distinct resonant gurgle is heard at the part where the stethoscope is placed. The sound, which is very loud at the hyoid bone, becomes duller and more distant the further the stethoscope is placed from that bone.

To examine the lower part of the œsophagus, the stethoscope must be removed to the spine and carried down the left side of the spines of the first eight dorsal vertebræ. Here the sound is still more distant, though very distinct, and is like a smooth body slipping through with a sort of cluck.

To ascertain the length of time it takes for a morsel to

travel the whole length of the canal, the operator should place the instrument over the cardiac orifice, and his finger upon the larynx; thus the moment the act of deglutition commences is known by the rise of the larynx, and its completion by the ear. The rate of swallow varies with different individuals, weakly persons being slower than the more robust.

In cases of dilated œsophagus, the fluid may pass the tube quickly enough, but the absence of energy is recognized by the want of grasp. The fluid passes down the tube with a squirting or running sound, not as though slung in a piece. It must be remembered, however, that in obstruction at the cardiac end the accumulation of mucus may, and often does, modify or prevent the usual sounds for some five or six inches above the seat of disease.

In tender places Hamburger says the morsel may be heard to stick or recoil. The tone of the swallow is changed in quality by the presence of rough ulcers and the like on the inner surface of the tube, so that it becomes deadened, though the more common and more easily observed result is the obstruction to the morsel in its passage; indeed, it is this prolongation of the passage of the food through the canal that is most diagnostic and easily recognized. So that in all cases where this is noticed you may be sure there is some diminution of the calibre of the canal interfering with its peristaltic action.

If the stricture be very tight, the morsel, when it reaches the spot, eddies through with a creak or even with a squeak, and should it be tighter still, we hear a resonant regurgitation of the food. It will be easily understood how valuable this means of diagnosis is, as in spasmodic contraction dysphagia is unknown to the stethoscope.

Of the use of the œsophagoscope as a means of diagnosis I have no experience, but I have little doubt in some hands it may be a useful aid, although I think for all practical purposes it is unnecessary.

The passage of an œsophageal tube is an important aid to diagnosis, as by this means you are enabled to discover the exact site of the disease; also, if the stricture be merely spasmodic or hysterical, the patient being anæsthetized, the instrument will pass easily into the stomach.

Several good specimens of cancer of the œsophagus are to be found in our Museums. In University College Museum the following are among the most interesting, the description of which I refer you to.

"1041. Portion of a pharynx and œsophagus, with the larynx and adjoining parts. In the posterior wall of the upper part of the œsophagus, immediately below the cricoid cartilage, a flattened tumour has grown. The growth extends over about an inch and a-half of the length of the œsophagus, within which it projects so as to cause considerable narrowing; the tumour is about one-third of an inch in thickness; the mucous membrane has been removed from its right side by ulceration. The divided surface of the growth has an open reticular texture, of which the meshes contain a softer homogeneous substance. The morbid growth is not distinctly limited at either its upper or lower borders; it is called in the MS. catalogue 'scirrhus,' but its nature is doubtful.

"From a man, æt. 68, whose general health had been good, and habits temperate. About seven months before death he felt pain near the hyoid bone in swallowing, and since that time had experienced constant pain in the right side of the head. Dysphagia supervened; and for some time before death fluids could be swallowed only with the greatest difficulty. One of the cervical glands on the left side commenced to swell soon after deglutition was impaired. After death, when water was poured into the pharynx, it did not pass the constricted part, but would do so in the reverse direction. On the right side the wall of the œsophagus was found to be connected with the posterior part of the cricoid cartilage. The œsophagus was contracted and its walls atrophied.

"There was no secondary growth in the viscera."

"1037. A tongue with the larynx, part of the pharynx and œsophagus, &c. The mucous membrane of the highest part of the œsophagus and lower part of the pharynx, as far as the upper border of the cricoid cartilage, is superficially ulcerated and has a somewhat recticular surface. At the lower limit of this surface the œsophagus is greatly narrowed, almost closed; and its walls, corresponding with the whole of the ulcerated surface, are infiltrated by some morbid growth, so as no longer to present a distinction between its several coats; the upper and lower margins of

the ulcerated surface are slightly raised and everted. Immediately below the ulcer the mucous membrane is unaltered in appearance, and the fibres of the muscular coat are separate and distinguishable. On the left side of the strictured portion of the œsophagus, and reaching for some distance below it, is a cavity formed apparently in the soft tissues around the œsophagus, and which communicates above with its interior.

"From a woman, æt. 33 ; admitted under Mr. Erichsen's care, January 1859. The patient's ailment commenced nearly four years previously (April 1855), with slight soreness of the throat opposite the crico-thyroid membrane, which persisted in spite of various remedies employed. In December 1858 considerable difficulty in swallowing fluids came on, and by the end of that month she was unable to swallow either solids or liquids, the latter being ejected by the nose or mouth almost immediately after being taken. On admission nothing larger than a No. 6 gum-elastic catheter could be passed through the stricture, and even this with some difficulty. The stricture appeared to be on a level with the cricoid cartilage ; there was no external swelling. Nothing in the family history of the patient threw any light upon the nature of the disease, nor was any roughness felt during the passage of the instrument ; nor did any hæmorrhage follow this. Beef tea, eggs, &c., were injected regularly into the stomach by a catheter ; but about three weeks before her death (February 6, 1859) it became impossible to pass any instrument. Nutrient enemata were then successful for about a fortnight ; but the bowel became then so irritable that it would not retain the fluid injected, and she died of inanition. A microscopic examination showed the growth to be an epithelioma."

"1047. The lowest three inches of an œsophagus with the cardiac portion of the stomach, the œsophagus being the seat of a malignant tumour. The parts have been divided through the middle of the growth, which is somewhat fusiform, and measures about an inch and a half in breadth. By the pressure of the tumour about an inch of the œsophagus is considerably narrowed ; over its upper surface the mucous membrane is ulcerated. The highest part of the growth lies between the mucous membrane and muscular coat of the œsophagus. A microscopic examination showed the growth to be an epithelioma."

Treatment. — The plans of treatment which demand the surgeon's serious attention, as being the only means at his disposal for giving relief to the patient, are : œsophagotomy ; œsophagectomy (internal or external) ; gastrostomy : the passage of a small gum-elastic œsophageal tube ; and, lastly, Mr. Symonds' method of passing a tube, through the stricture, furnished with a funnel-shaped end, which rests upon the upper

face of the stricture, thus preventing its further descent in the canal. A case illustrating the use of this form of œsophageal catheter was shown at the Clinical Society on the 23rd January, 1885, where a patient with malignant stricture of the œsophagus was exhibited wearing one of them; the tubes also were shown. The patient, a man, aged 40, gave a history of seven weeks' dysphagia before coming under treatment on the 23rd June, 1884. At that time he was unable to swallow, and it was impossible to pass a bougie. He, however, on the day of admission, managed to swallow some milk, and in a few days took fluids freely. The first tube was passed on the 15th July. This was the usual long œsophageal catheter, and projected from the mouth. It proved a source of great discomfort, and had to be removed in thirty-six hours. The long tube produced much laryngeal irritation, and, by plugging the stricture, prevented the descent of the saliva, and gave rise to constant expectoration. The tube brought before the Society by Mr. Symonds was designed to remove these inconveniences, while retaining the advantages of the method of treating œsophageal stricture by permanently wearing a tube. Its length was about six inches; one end expanded into a funnel, having an outside diameter of half to three-quarters of an inch; the other had the same construction as an ordinary catheter. The tube was passed through the stricture, the funnel resting on its upper face, thus preventing its further descent. For removing it, a piece of strong silk was attached, carried out of the mouth, looped over, and fastened behind the ear. These tubes were made of gum-elastic material. The patient had been wearing the catheters since the 15th July. They had been renewed at various intervals—at first of a week, and later they had been retained a fortnight and three weeks. No difficulty was experienced in removing them, nor did the patient suffer any inconvenience from their presence. The man could swallow fluids freely, and had gained in weight. The advantages

claimed for this form of tube were that, while maintaining a passage into the stomach, it did not interfere with deglutition, produced no irritation, was not unsightly, allowed of the swallowing of the saliva, and, moreover, retained to the patient the pleasures of taste. The man was able to move about with comfort, and, except for the silk passing out of his mouth, was not aware of the presence of the tube. It was suggested that, if the cases of this disease were taken earlier, a larger tube might be employed, and the patients kept in comparative comfort, while at the same time the number of cases necessitating gastrostomy would be greatly diminished. It was the desire to avoid this operation, often so unsatisfactory, that led to the construction of the tube.

It is to the relative merits of these different operations that we must now turn our attention; and it will be well, I think, to commence with the less heroic method, namely, the passage of a gum-elastic œsophageal catheter, or Symonds' funnel-shaped tube, through the stricture, retaining it there, and feeding the patient by this means. It has been suggested by many surgeons that there is very great danger in passing these instruments through the stricture, as, owing to the destructive nature of the disease, and the excessive friability of the parts so affected, there is a great risk of pushing the catheter through the walls of the œsophagus into some of the neighbouring structures or cavities; further, that troublesome hæmorrhage is often set up which is difficult to arrest. Another argument against their use is that in very tight strictures the part just above the stricture is much dilated and sacculated, and there is, consequently, a great difficulty in hitting off the lower opening; and, secondly, if any force be used, the instrument is liable to be pushed through the thinned and weakened walls of the œsophagus.

I think every one will recognize that these are very good and cogent reasons against the use of the tubes in some cases

of stricture ; and, as Mr. A. Durham remarks, if the tube be clumsily or carelessly used, there may be much danger, but he has no fear at all in the matter, if the instrument be soft, and the surgeon bear in mind that his duty is not to "force a passage, but to find a way," through the stricture.

Mr. Arthur Durham relates a case that illustrates this very forcibly. It was that of a woman under his care at Guy's Hospital, who suffered for a considerable time from dysphagia. A large growth had been recognized at the back of the larynx, no doubt epitheliomatous ; and the question was raised of the removal of the larynx. She was obliged to leave the hospital for a time, and on her return the growth was too advanced for operative measures. She was therefore fed as well as she could be. There was no very serious interference with the voice, or dyspnœa. Later on, complete dysphagia occurred, and for some two or three days she was nourished by nutrient enemata.

The question then arose, whether gastrostomy, œsophagotomy, or the removal of the larynx and pharynx, should be resorted to. Mr. Durham succeeded in passing a No. 7 catheter into the stomach, and the patient was rendered comfortable. The catheter has been in four months, being changed from time to time. She was fed entirely through it. The growth could be seen—a large malignant mass, growing from the posterior wall of the larynx and round the pharynx. She had never had the slightest pain or inconvenience. Mr. Durham naïvely asked: Would this woman have been in a better condition if he had removed the larynx and pharynx ?

Dr. Küshaber, at the Congress of 1884, brought forward a number of cases in which he had passed tubes into the stomach, and left them in an indefinite time ; but, as a rule, patients do not bear them to be retained so long a time.

The tube suggested by Mr. Symonds, and already described, has, I think, many advantages for cases in which the stricture is situated below the larynx ; in these it does not produce any

laryngeal irritation, it allows the patient to feed himself in the ordinary way, and, above all, it allows the flow of saliva to descend into the stomach, and so gives relief to the excessive annoyance of constant expectoration or dribbling of the saliva from the mouth.

Œsophagotomy.—I have had no experience of this operation; it was first suggested, I believe, by Billroth. Mr. Reeve, however, at the Clinical Society, strongly advocates œsophagotomy, and he brings forward many arguments in its favour, which, if he could maintain by statistics, might lead some to follow in his footsteps. He lays the following rules down :—

"1. Because of the great mortality after gastrostomy, and also because of the more frequent occurrence of malignant stricture in the upper portion of the tube, œsophagostomy was by far the preferable operation. 2. Even in cases where the stricture was as low down as the manubrium sterni (its depth rarely being very great), œsophagostomy was indicated as a preliminary or exploratory operation; and, if it were found that the little finger or sound could not be passed through the narrowing, gastrostomy might then be performed. 3. If it resulted that the opening in the œsophagus had been made below the stricture (as in most cases would be desired), the operation could be completed by stitching the mucous membrane to the edges of the wound, and the stricture might, if thought proper, be dilated through the opening either at the time of opening or subsequently. 4. If the diseased œsophagus were reached, and no opening into it could be made through healthy walls, then it might be carefully performed, either by the finger or the thermo-cautery. 5. Œsophagotomy had been many times done, œsophagostomy several, and never had these operations caused any grave local or general symptoms, or, as operations, led to the death of the patient; whereas gastrostomy had proved most fatal. 6. The operation should be done on the left side of the neck, and a sound, if possible, be passed, that of Vacca-Berlinghieri being the best.

The skin-incision should be rather nearer the mid-line than that for ligature of the common carotid, and should extend from half-an-inch above the episternal notch to the level of the upper border of the thyroid cartilage. The surgeon should stand on the left of the patient, looking obliquely down and across his or her body. A tube with a funnel-shaped end should be passed, tied in place, and nourishment administered as soon as the tendency to vomit caused by the anæsthetic had passed off. It was necessary to make the opening in the walls with a sharpish stab, to prevent the loose mucous membrane being pushed before the knife. The edges of the wound might be stitched up, and care taken that no food entered it. 7. The operation should be undertaken before the patient's strength was much exhausted, and even before obstruction was complete, because frequently attempts to swallow produced spasmodic suffocative dyspnœa, as in the first case related. 8. In severe cases of simple, fibrous, or syphilitic stricture in the tracheal or upper thoracic portion of the tube, œsophagostomy was indicated, as then the operation might be curative, as well as palliative."

As all operations in connection with malignant diseases of the œsophagus can but be palliative, without the surgeon is able to remove the whole mass by excision, I think that unless the disease is situated very high up the operation of œsophagotomy would be very difficult, and certainly not so free from risk as Mr. Reeve would have one to suppose. Undoubtedly, if the opening can be made below the stricture, and the mucous membrane stitched to the edges of the wound, the patient would be placed in a comparatively comfortable position. But I take it this could very rarely be the case, and if such a case did occur, I think it must be in such an early stage that there would have been little or no difficulty in passing a tube through the stricture and relieving the patient in that way.

Œsophagectomy.—Complete excision of a portion of the œsophagus was first suggested by Billroth in the year 1872. He determined to operate in the first instance on a dog. The full description is to be found in Langenbeck's "Archives," 1872, in a paper bearing the title of "Ueber die Resection des Œsophagus," and runs as follows:—

Professor Billroth states that some time ago, after a post-mortem examination of his first patient affected with carcinoma of the œsophagus, the possibility suggested itself of making a resection of this part of the alimentary tube. The fact that the lymphatic glands in the neighbourhood of the diseased part are not generally affected, and the partial success which had attended the operation of œsophagotomy in this disease, together with the analogy of external urethrotomy in cases of gangrene or ulceration of the urethra, seemed to lend support to this idea.

On the 21st April, 1871, a large dog was put under the influence of chloroform, and a piece about an inch and a-half in length was cut out of the whole circumference of the œsophagus. The lower end of the divided tube was then fastened by a couple of sutures to the skin at the margin of the external wound. Up to the 26th of the same month the animal was fed with milk through a tube passed into the wound, but on and after this date the tube was passed by the mouth. A week after the operation the sutures were removed. By the end of June the fistulous opening had completely closed, and the process of healing would have been quicker if it had not been that the dog, like a human patient, dissatisfied with "milk diet," purloined the more solid food of neighbouring victims to science. After the closure of the œsophageal fistula, which took place at the end of June, the tube was daily dilated by a bougie of the diameter of a large index finger. After the healing of the wound the dog was in capital condition, eating meat, potatoes, &c., but the variety of fare was

not allowed to extend to bones. On the 26th July the animal was killed by cyanide of potassium; and all that was found as a trace of the operation was an annular scar scarcely half a line in width, moreover easily dilatable.

To Czerny, however, was reserved the honour of first operating upon a human being; it was the case of a country-woman, 51 years old, poorly nourished, but otherwise in fair condition, seeking for relief. For nearly five months previously she had suffered from difficulty in swallowing, but at first had thought little of it, for in 1875 a similar difficulty had existed for a while, then ceased spontaneously. But now it gradually grew worse, till she could no longer swallow solid food. A soft, easily bleeding swelling could be felt with the finger far down the pharynx, causing so great obstruction that a bougie could not be passed beyond it. No glandular enlargement was detected. On the 2nd May Czerny cut down on the left side of the neck, as for œsophagotomy, and completely removed six centimètres of the upper end of the œsophagus. The resected portion included the whole of the disease, an epithelial ulcer which involved the tube in its entire circumference, but had not at any point penetrated the muscular coat. The stomach end of the divided œsophagus was fastened to the edges of the opening in the neck, and through it food was introduced by means of a funnel into the stomach. She recovered, and left the hospital; and five months later came to report herself as "quite well, and at work in the fields, able to feed herself comfortably through the funnel and tube." Indeed, so satisfied was she with her condition, that she steadfastly refused the further operation which Czerny had planned for bringing together the divided ends of the œsophagus.

That œsophagotomy may be practised on simple stricture high up, or for the removal of foreign bodies in the pharynx or upper part of the œsophagus, there can be no doubt; but for malignant disease I do not think it should be resorted to.

Gastrostomy was practised as early as 1635, when a surgeon named Shoval opened the stomach of a man who had swallowed a knife six inches and a half long, which had been retained in the viscus for about six weeks. He performed the operation by making a straight vertical incision through the left hypochondrium, two fingers' breadth below the false ribs. The wound was united by five sutures, and dressed with tents impregnated with tepid balsam, and a cataplasm of bolar earth, white of egg, and alum. The wound healed quickly and well. I find no record of the operation being performed after this until the year 1849, when Sédillot operated on a man for malignant disease of the œsophagus, the patient dying ten days after from exhaustion. The record of cases operated upon between 1849 and 1876 constitute an unbroken series of failures; the operation was repeated some twenty-five times, and most of the patients died within the first few days, one only surviving forty days. In 1876 Verneuil obtained the first real success. His patient, a healthy lad, 17 years of age, some months previously had swallowed a solution of caustic potash; this was followed by intense pain in the throat, with exfoliation of the mucous membrane of the stomach. When the acute symptoms had subsided, the patient experienced great difficulty in swallowing. The dysphagia increased, and attempts at catheterism of the gullet were frequently made, but without success. The stricture was situated about seven inches below the upper end of the gullet, and so low as to preclude the idea of œsophagotomy; it was therefore decided to perform gastrostomy.

The portion of the stomach exposed was carefully stitched to the lips of the wound in the peritoneum and abdominal wall. The viscus was then laid open, and a vulcanite tube introduced. The patient made a good recovery, and almost at once was able to take liquid food through the artificial opening. At the time of the operation the weight of the patient was 72 lbs., a month

later 75 lbs., and three months after 92 lbs. The lad lived seventeen months.

Since 1876 the operation has been frequently repeated. The most elaborate statistics of the results are published by Blum.* He tabulates 131 gastrostomies; of these, 85 died before the twentieth day, that is, in consequence of operation, thus giving a mortality of 65 per cent.; 38 survived from several months to two years and more. One other point which these statistical Tables point out is worthy of notice; it is this: by eliminating the gastrostomies for cancerous disease of the œsophagus, we have left 25 examples in which the operation has been performed for fibrous or non-cancerous strictures. Of these, only 12 patients died before the twentieth day, showing a mortality of 48 per cent.

I think that if the merits of gastrostomy had no other basis than its success in non-cancerous strictures, it ought to claim our respectful consideration; and it is quite possible that if in cancerous cases we resorted to the operation at an earlier period, and before the patient's power had fallen to a low ebb, the successes would be more numerous.

In the years 1858 and 1859, in this country, gastrostomy was first performed by Mr. Cooper Foster, who operated twice; in one case for malignant disease causing complete obstruction of the œsophagus; and in the other for a stricture caused by the patient swallowing a solution of caustic alkali. The first of these cases lived forty-four hours, and in the second, death occurred on the fourth day from peritonitis. Since that time the operation has been practised many times by various surgeons, but to Mr. Howse is undoubtedly due the credit of suggesting the desirability of dividing the procedure into two parts: the first, opening the peritoneal cavity, and accurately stitching the visceral peritoneum to the edges of the wound, being careful that the visceral and parietal coverings of the peritoneum are brought into

* "Archives Générales de Médecin," November 1883.

intimate contact; and later on, on about the fifth day, opening the stomach. By this means, undoubtedly, the risk to the patient is very much lessened.

It must be borne in mind here that gastrostomy after all is only an operation that is performed with the view of relieving the patient, and with the hopes of prolonging life slightly. I have collected thirty-five cases where gastrostomy has been performed for malignant stricture of the œsophagus, and undoubtedly the results are not encouraging. Thus, only one survived six months, one three months, two were alive at the time the cases were reported, one forty-two days, and the other three months after the stomach was opened. The average length of time patients lived after the performance of the operation was one month.

Gastrostomy has been resorted to according to Gross in at least 167 cases for carcinomatous stricture of the œsophagus, of which 49 died as the direct or indirect result of the operation, 21 from peritonitis, 11 from pneumonia, bronchitis, or pleurisy, 10 from shock, 4 from phlegmonous gastritis, 2 from uræmia, and 1 from septicæmia; the mortality was therefore in these cases 29·34 per cent., which is, as Gross points out, greater by 14·34 per cent. than gastrostomy for foreign bodies, only 3 out of 20 of the latter having proved fatal. Of the entire number, 117 died within a month, 4 were living, but how long cannot be determined, and 46 survived longer than one month, the average duration of life being, after the stomach was opened, thirty-three days.

Of the 46 that lived upwards of one month, 28 expired subsequently—2 in five weeks, 2 in seven weeks, 9 in two months, 2 in two months and a-half, 3 in three months, 2 in four months, 2 in five months, 1 in six months, 1 in seven months, 1 in seven months and a-half, 2 in eight months, and 1 in ten months. Of the remaining 18, 3 were living at the expiration of one month, 2 at forty days, 4 at two months, 2 at three months and a-half, 2 at four months, 1 at five months, 1 at six months, 1 at seven

months, 1 at twelve months and nine days, and 1 at thirteen months. The last two cases, the most successful on record, were under the care of Mr. W. Whitehead, of Manchester.

Professor Verneuil, in 1879, published some statistics showing that in thirty cases in which gastrostomy had been performed for cases of malignant disease of the œsophagus, only one survived a month. The statistics will, however, undoubtedly in the future be far more encouraging, since abdominal surgery is becoming so very much better understood. The chief object is to operate early; by adopting this course I am inclined to think the progress of the disease may be retarded, as the constant irritation to the raw ulcerated surface by substances passing over or lodging in the stricture tends much to aggravate the distress of the sufferer and to cause the disease to increase more rapidly; just as will be shown in the chapter on cancer of the rectum, colotomy alleviates the sufferings and prolongs life.

It now becomes my task to examine into the results of the different operations, and to try and arrive at a conclusion as to the method of treatment which is the most likely to give relief. And here let me pause a moment to again emphasize any remarks I may make with the statement that all operations whatsoever are simply palliative; that no cure can be anticipated, but that undoubtedly much may be done to alleviate the sufferings of the patients, and, I believe, if seen early enough, to prolong life.

The operation of œsophagotomy has been so rarely done for malignant disease, and the difficulty of diagnosing for certain the exact limits of the disease is so great, that at present I would prefer speaking most guardedly upon the subject; but I cannot help thinking, unless the surgeon can be quite sure that the disease is limited in extent to the pharynx or the upper part of the œsophagus, the operation of œsophagotomy should never be practised. Again, if it is certain that the disease is limited to a very small portion of the upper part of the œsophagus,

such as to warrant the performance of this operation, I think the surgeon might go still further, and endeavour to excise the whole of the diseased parts, and so give the patient the benefit of the only operation that can by any possibility give him a chance of a radical cure. Œsophagostomy has been done in 21 cases, as recorded by Dr. Gross; 4 recovered, and 17, or 80·95 per cent., died. Of the latter, however, 5 died of exhaustion, and 12 as the result of the operation—7 from shock, 1 from septicæmia, 1 from pyæmia, 1 from pneumonia, 1 from phlegmon of the anterior mediastinum caused by penetration of the mediastinal tissues by the sound, and 1 from penetration of the posterior mediastinum by the tube. Hence the mortality may be placed at 57·14 per cent. All the deaths occurred before the nineteen days after the operation, excepting that from septicæmia, which took place in three months.

Of the 4 who recovered from the operation, 1 lived two months, 1 three months, 1 five months, and 1 sixteen months. The average duration of life in all the cases after the operation was forty-six days; but if, as Dr. Gross remarks, the case which lived sixteen months be excluded, on account of the uncertainty of the true nature of the disease, the average life will be reduced to twenty-nine days.

Another danger to be encountered after this operation is that of passing the tube through the œsophagus into the surrounding tissues when feeding the patient. This was done in four cases referred to above. Thus, in one case, gangrene of the retro-œsophageal tissues was produced; in another, phlegmonous inflammation of the anterior mediastinum; the posterior mediastinum was perforated in the third case.

In one case operated on by Annandale a second stricture was discovered lower down the gullet after he had performed the operation, and he was obliged to perform gastrostomy.

Internal œsophagectomy has been only practised on one occasion by Schiltz. The patient lived for six months, but the

operation had to be repeated during that period five times to enable the tube to be kept open.

Œsophagectomy.—Czerny was the first surgeon to perform this operation on the human being; and in 1883 the operation was again performed on two occasions by Von Bergmann and Novaro, when the former excised an inch and a-half, and the latter two inches and a-half, of the gullet. In both these operations tracheotomy was had recourse to on account of impending death from suffocation. Von Bergmann's case died within twenty-four hours of the operation; that of Novaro was alive seven weeks afterwards. Billroth removed the œsophagus from the pharynx to the sternum, together with the entire larynx and thyroid gland. The man was fed through an elastic tube for four weeks, when the outer wound closed, and bougies were used to effect dilatation of the passage. Towards the end of six weeks the bougie entered the peri-œsophageal tissues, and the man died. Israel, in another case, extirpated a circular piece of the œsophagus, but the man died on the seventh day. Besides these, we have the case operated upon by Czerny, and already referred to, where the patient was alive and able to feed herself five months after the operation. We have also Billroth's experience of experiments upon dogs, both of which, I must say, are encouraging; but until such time as I have seen either operation practised with advantage to the patient, I cannot recommend my readers to adopt them.

Then we come to the method of passing catheters through the stricture, or adopting Mr. Symonds' method of gum elastic tubes. Both of these have much to recommend them. If the stricture be high up, I do not think Symonds' tubes would be applicable, as they would in all probability interfere with the epiglottis and cause much irritation. So that, in this class of cases, if you decide upon attempting to feed the patient by the tube, the long gum-elastic catheter is the only one that can with safety be used.

In strictures lower down, as in the upper part of the middle third and below, no doubt Mr. Symonds' tubes are a very useful advance upon the old method.

I cannot quite agree with Mr. Durham in this matter, as I am sure in many cases there is very great difficulty in passing a catheter through the stricture; and from the softened condition of the tissues around the disease, as well as the sacculated nature of the upper part of the tube in others, if the surgeon is not excessively careful in the first instance, and lucky in hitting off the opening below the dilation in the next, he will be very liable to force the tube out of the tract into the surrounding tissues, possibly into the pleura or other important parts. That tubes are not well borne is thoroughly established, and they have at the furthest to be removed every second or third day. In the matter of the long tube, by blocking up the stricture the patient is unable to swallow his saliva, which of necessity must dribble from his mouth, and be the source of the greatest misery to him. This is prevented by the use of Mr. Symonds' tubes; but even these cannot be tolerated for very many days at a stretch. In both these cases, then, the frequent passage of instruments is fraught with a certain amount of danger; in many cases the danger is very imminent, and in all cases the passage of them is accompanied by much pain to the patient and anxiety to the surgeon.

The irritation, moreover, caused by their frequent introduction must, in my opinion, of necessity be such as to lead to increased congestion of the part, and, hence, growth of the disease. I would therefore, in all cases where operative interference is indicated, recommend you strongly to adopt that measure which at once is most likely to enable you to feed your patient without interfering in any way with the disease. This can only be accomplished by *gastrostomy*. And here I would advise you in all cases to perform the operation as early as you can, after you have once recognized for certain that your

patient is suffering from malignant disease of the œsophagus. Although the operation apparently has not been attended with any very good results, yet I believe this is mainly due to the fact that it usually has been resorted to as a *dernier ressort*, when the patient, in fact, would speedily have died from inanition if something were not done. If any real benefit is to be anticipated, the operation must be done early, the same as in all other operations for cancer or other malignant diseases. Undoubtedly peritonitis is much to be dreaded, but I think, by adopting the plan now universally practised in these cases of dividing the operation into two parts, as recommended by Mr. Howse, this risk is reduced to a minimum, and need scarcely be placed in the balance. Peritonitis is, in fact, nearly, if not quite, eliminated from the risk to the patient in all abdominal surgery by the precautions which are adopted in the present day. And I think, if you refer to the list of cases recorded by me, there are very few indeed that died from this complication; and I may say, in later years, peritonitis has scarcely ever been the cause of death.

It will be seen, then, that in determining upon the best course to pursue in different cases, the selection must be governed by the nature, situation, and extent of the disease.

Catheterism, as being the simplest, should be practised first, with the double object of discovering the seat and extent of the disease and sustaining your patient's strength; in all cases, however, great caution and patience must be exercised. If the cancer be situated at the upper part of the œsophagus, base of tongue, or pharynx, then œsophagotomy may be justifiable; but I should recommend in even such cases that gastrostomy should have the preference, it being the best means of introducing food into the system without in any way interfering with the seat of the disease, and preventing the accumulation of food at or above the seat of mischief, and thus being the most likely operation to prolong life and retard the growth of the disease.

Moreover, the surgeon is never certain that a second growth may not exist lower down in the œsophagus, in which case this operation would be worse than useless.

Operations.

Œsophagotomy.—To perform this operation, the patient should be in the recumbent position, and placed fully under the influence of an anæsthetic. A pillow should be passed under the shoulder so as to allow of the head being thrown well back, the face being turned over to the right side. An incision is then to be made on the left side along the groove in front of the sterno-mastoid muscle from a point about opposite the middle of the thyroid cartilage to near the sternum. It is important that this incision should be sufficiently free to allow plenty of room for the further dissection required to reach the œsophagus. The platysma and cervical fascia having been carefully divided, the carotid sheath with its contained vessels is brought into view. This must be cautiously separated by the handle of the knife or other blunt instrument from the laryngeal muscles; the thyroid body and trachea being held out of the way by retractors, the œsophagus is then seized with a pair of forceps, and the point of the knife sharply thrust into it, and the tube opened to the extent required. The cut surfaces of the œsophagus are then drawn out and stitched accurately to the edges of the wound. The parts should be thoroughly dusted with iodoform, and a pad of antiseptic gauze or wool applied over the wound.

Should the surgeon decide to resect the whole of the diseased mass, the same steps should be taken, and by careful and tedious dissection the parts may be removed.

After-treatment.—The patient is to be fed by means of a soft india-rubber tube introduced into the lower end of the œsophagus, and beef tea, milk and egg, or other liquid food poured in by means of a funnel.

Gastrostomy.—I think the best method of performing this operation is: the patient having been placed in the recumbent position, with a small pillow placed under the centre of his back, and he being thoroughly anæsthetized, an oblique incision three inches long, commencing a little below and to the left of the ensiform cartilage, and about an inch to the inner side of the border of the left costal cartilages, and nearly parallel with them, is carried through the skin and superficial tissues; the muscular fibres and other tissues should be carefully divided down to the peritoneum. All bleeding points must be seized with the clamp forceps, and, if necessary, ligatured before the peritoneal cavity is opened.

Mr. Durham recommends a vertical incision three or four inches in length over the upper part of the left linea semilunaris.

Sédillot advises and practises a crucial incision, passing through the upper part of the left rectus.

Labbé makes an incision about two inches in length, extending from the left linea semilunaris outwards for about two inches, parallel to the costal cartilages and distant from them about half-an-inch.

The incision usually adopted, however, is the first described, and it is most important to have plenty of room; the length of the incision in no way adding to the risk of the operation to the patient.

The peritoneum should be divided the whole extent of the external wound. In the dead body it is found that the anterior wall of the stomach when undistended touches the abdominal parietes in a triangular space, bounded above, on the left side by the costal margin, on the right side by the edge of the liver, and below, by a line drawn from about the centre of the inner costal cartilage transversely outward to the liver. This is an almost constant condition, and is only interfered with when the left lobe of the liver is enlarged. The liver usually touches the costal margin on the left side behind the linea semilunaris at

a part which lies over the right cartilage. It consequently follows that it is useless to prolong the incision through the rectus muscle and thus expose the liver.

The peritoneal cavity having been opened, if the surgeon bears in mind the above-named relation, he will have no difficulty in finding the stomach, which should be brought out through the wound and stitched accurately to it, taking the greatest care that the parietal and visceral covering of the peritoneum are brought in close contact. It must be borne in mind that the safety of the patient depends on the firm union of the stomach to the abdominal wall. Difficulty has, however, been met with in finding the stomach. The late Mr. Maunder encountered a serious difficulty, which caused him to open the transverse colon instead of the stomach. To avoid a similar accident, Schörborn, of Königsberg, has suggested that a small india-rubber bag should be fixed to the end of an œsophageal tube; as soon as the latter has passed through the stricture the bag is compressed; this forces the anterior wall of the stomach into the wound, and the operation is clearly rendered easier: this suggestion, of course, presupposes the permeability of the stricture, which is rarely the case. All recent authors seem to agree that the sutures must be numerous and close together; there are some who think that the parietal sutures should be passed only through the skin, while others maintain that they should traverse the whole thickness of the abdominal wall; others, again, consider that the stitches should be passed through the peritoneum and skin only, thus bringing the greatest possible amount of parietal peritoneum in contact with the visceral layer. I am certainly in favour of the latter method; further, I think, so important is it to obtain accurate apposition of the two peritoneal coverings, that it is quite worth the extra time and trouble to adopt Professor Dittel's method of uniting the parietal peritoneum and skin by a few interrupted sutures, then stitching the anterior wall of the stomach to it,

being careful to pass the needle through only the peritoneal and muscular coats of the viscus, forming broad loops, and then through the whole thickness of the abdominal wall. The stomach being thus firmly attached to the parietal walls of the abdomen by numerous sutures, the wound should be dusted over with iodoform and dressed with thymol or some other soft dry antiseptic dressing, and the patient returned to bed. He should be fed for the succeeding four or five days entirely by means of nutritive enemata, at the end of which time the dressing may be removed and a small opening made into the stomach sufficiently large to admit about a No. 10 catheter; this completes the operation. It is not, however, always so easily accomplished, and for this purpose Mr. Bryant has suggested that at the time of performing the first part of the operation two stitches should be introduced through the peritoneal covering of the stomach near the centre of the wound, which serve to steady the parts while the incision is being made. Another method of opening the stomach is to have the exposed portion held well forward, and then passing a tenotomy knife obliquely through its coats, making a small opening, then slipping a silver probe, bent to a right angle about an inch from its point, along the blade of the knife, next removing the knife and introducing another probe similarly bent; then finding out the course of the muscular fibres, and pulling at right angles to them, an opening is secured through which it is easy to pass a No. 10 catheter. I do not consider these measures at all necessary, as I find little difficulty in incising the wall of the viscus. An anæsthetic is unnecessary in this part of the operation, as the stomach wall is devoid of pain.

An ordinary catheter connected to a funnel by an india-rubber tube should be inserted into the stomach, and warm peptonized beef tea or milk introduced, at first very little at a time; the food can be retained by using a spring clip which closes the tube. The parts around the opening should be

dusted over with powdered chalk, as the gastric juice is very apt to escape alongside the tube and irritate the skin, in fact digest it.

The patient at first should be fed every two or three hours; by degrees the intervals may be lengthened, until ultimately the patient will be able to feed himself as occasion requires, with very finely minced meat, eggs, beef tea, milk, and the like.

Mr. B. Barrow reported a case at the Medical Society in December 1884, in which he had adopted another form of procedure. Strict antiseptic precautions being used, an incision through the skin, commencing an inch and a-half below the xiphoid cartilage, and continued downwards parallel to the lower margins of the costal cartilages on the left side, and about a finger's breadth from them, for about three inches. The deeper incision was more vertical, taking the direction of the fibres of the rectus muscle. The peritoneal cavity being thus opened, the transverse colon first presented itself, and gave a little trouble; however, by following upwards the great omentum, the stomach was reached and drawn out of the wound. A portion of its anterior wall was pinched up by the fingers, and two hare-lip pins made to transfix it through its whole thickness, in a direction transverse to the skin-wound, the pins being inserted half-an-inch apart. Catgut sutures were now introduced so as to bring accurately together the deep peritoneal as well as the superficial parts of the wound closely around the pins and the protruding portion of the stomach; but no sutures were introduced into the stomach, which was maintained in position by the pins. Iodoform was dusted over the wound, and dry antiseptic dressings applied, which were not changed for five days, when the wound was found to have united by the first intention.

CASES of Cancer of the Œsophagus, collected from Cancer Hospital

No.	Character.	Sex.	Age.	Seat.	Ulceration.	Affecting surrounding or other parts of Body.	Total Duration in Months.
1	Ep.	M.	38	Middle	Yes	No	8
2	Ep.	M.	40	Lower	Yes	No	9
3	Ep.	M.	....	....	Yes	No	....
4	...	M.	56	Stricture	....	....	....
5	Ep.	M.	64	Upper	Yes	....	10
6	Ep.	F.	60	Middle	Yes	Neighbouring tissues	6
7	Sch.	F.	35	Middle	Yes	....	96
8	Ep.	M.	65	Middle	Yes	....	....
9	Ep.	M.	67	Upper	Yes	Left pyramid of thyroid	10
10	....	M.	17	Stricture, swallowing caustic potash	....	....	....
11	Ep.	M.	59	Lower	Yes	Pericardium, heart adherent	13
12	Ep.	M.	60	Middle	Yes	....	15
13	Sch.	M.	48	Lower ...	Yes	....	5
14	Ep.	M.	61	Lower	Yes	Lesser curvature of stomach	9
15	Sch.	M.	45	Lower	Yes	Liver	7
16	Ep.	F.	45	Middle	Yes	Thor. aorta	9
17	Ep.	F.	60	Upper	Yes	....	10
18	Ep.	F.	58	Middle	Yes	....	7
19	Ep.	M.	50	Lower	Yes	Aorta, trachea	11
20	Ep.	F.	36	Upper	...	....	12
21	Ep.	F.	56	Middle	Yes	....	7
22	Ep.	M.	56	Middle	Yes	Aorta	3
23	Sch.	M.	56	Middle	Yes	Liver, spleen, kidney	....
24	Ep.	M.	59	Middle	Yes	....	6
25	Sch.	M.	45	Middle	No	....	9
26	Sch.	M.	58	Middle	No	....	12
27	Sch.	M.	55	....	....	....	14
28	...	F.	51	Stricture	....		....
29	Ep.	M.	60	Lower	No	....	8
30	Ep.	M.	40	Upper	Yes	Trachea	....
31	Ep.	F.	45	Upper	Yes	....	....
32	Ep.	M.	54	Middle	Yes	Stomach	8
33	Ep.	M.	46	Middle	Yes	....	12
34	Ep.	F.	60	Lower	Yes	....	4
35	Sch.	M.	59	Lower	Yes	....	7

the Medical Journals, Reports of Societies, and Case Books.

Affection of Glands.	Affection of Lungs.	Gastrostomy.	Authority.
No	No	Yes. Death, 7 days	B. M. J., 1872, vol. i, 623.
No	Yes	Yes. Death, 45 hours	„ 1872, vol. i, 623.
....	....	Yes. Death, 6 days	Clin. S. R., June 8, 1872.
....	....	Yes. Death, 56 hours ...	B. M. J., 1873, vol i, 588.
....	....	....	Path. R., Nov. 17, 1874.
Yes	No	....	Lancet, 1875, vol. i, 105.
No	No	....	„ 1875, vol. ii.
....	....	....	„ 1876, vol. ii, 751.
No	No	Yes. Death, 40 days	„ 1875, vol. i, 679.
....	....	Yes. Recovery	„ 1877, vol. i, 51.
....	....	Yes. Death, 91 hours ...	„ 1877, vol. i, 532.
No	No	....	„ 1877, vol. i, 940.
No	No	....	„ 1877, vol. i, 940.
Yes	Yes	Yes. Death, 4 days	„ 1879, vol. i, 475.
Yes	No	Yes. Death, 8 days	„ 1879, vol. ii, 425.
No	No	....	„ 1880, vol. i. 447.
No	No	....	„ 1880, vol. i, 717.
No	No	....	„ 1881, vol. i, 333.
....	....	Yes. Death, 4th day ...	„ 1881, vol. ii, 893.
....	....	Yes. Alive, 42 days	„ 1881, vol. ii, 942.
Yes	Yes	....	„ 1882, vol. i, 311.
Yes	Yes, L.	....	„ 1882, vol. i, 311.
Yes	Yes	....	„ 1883, vol. i, 13.
No	No	Yes. Death, 8 days	„ 1883, vol. ii, 57.
Yes	No	Yes. Death, 10 weeks	„ 1883, vol. ii, 57.
Yes	No	Yes. Death, 3 days	„ 1883, vol. ii, 57.
Yes	Yes	....	„ 1884, vol. i, 253.
....	....	Yes. Alive, 6 weeks ...	„ 1884, vol. ii, 182.
....	....	Yes. Death, 13 days	„ 1881, vol. i, 7.
....	....	....	B M. J., 1876, vol. i, 364.
....	....	....	„ 1876, vol. i, 364.
....	....	....	„ 1876, vol. ii, 445.
....	....	Yes. Death, 3 weeks.	„ 1878, vol. ii, 267.
....	....	....	„ 1880, vol. i, 249.
....	....	....	„ 1881, vol. ii, 974.

No	Character.	Sex.	Age.	Seat.	Ulceration.	Affecting surrounding or other parts of Body.	Total Duration in Months.
36	Ep.	M.	61	Lower	Yes	....	10
37	Ep.	M.	54	Lower	Yes	....	7
38	Ep.	F.	45	Lower	No	....	6
39	Sch.	M.	56	Middle ...	Yes	Aorta, left lung	4
40	Ep.	M.	60	Middle	Yes	....	3
41	Ep.	M.	65	Upper	Yes	....	3
42	Ep.	M.	64	Lower	....	....	3
43	Ep.	F.	45	Middle	Yes	....	....
44	Ep.	M.	55	Upper	Yes	Bronchial gland	4
45	Ep.	M.	42	Lower .	Yes	Aorta, right lung	14
46	Ep.	M.	46	Middle	No	....	9
47	....	M.	51	Stricture..	No	....	....
48	Ep.	M.	56	Lower	Yes	Spleen and lung	....
49	Sch.	M.	55	Lower	No	Pericardium	14
50	Ep.	M.	52	Middle	Yes	Aorta, bronchi, pericardium, left auricle of heart	4
51	Ep.	M.	50	Lower	Yes	....	13
52	Ep.	M.	40	Middle	No	....	7
53	Ep.	M.	43	Middle	Yes	....	13
54	Ep.	M.	68	Middle	Yes	Right bronchi	6
55	Ep.	F.	58	Middle	Yes	....	12
56	Ep.	F.	42	Upper	Yes	....	8
57	Ep.	M.	64	Middle	....	....	3
58	Ep.	M.	64	Upper	....	....	15
59	Ep.	M.	37	Upper	Yes	Pharynx and tonsil	12
60	Ep.	M.	49	Upper	Yes	....	15

Affection of Glands.	Affection of Lungs.	Gastrostomy.	Authority.
Yes	Yes	Yes. Death, 2 months	Lancet, 1881, vol. i, 573.
Yes	No	Yes. Death, 21 days	„ 1881, vol. ii, 53.
....	....	Yes. Death, 6 days	„ 1884, vol. ii, 223.
Yes	Yes	....	Can. M. S., 1882.
No	No	Yes. Death, 24 hours	Dul. Surg. Soc., Feb. 10, 1882.
No	No	Yes. Death, 13 days	B. M. J., 1882, vol. i, 538.
No	....	....	„ 1882, vol. i. 539.
No	No	....	„ 1882, vol. i, 664.
Yes	No	Yes. Death, 3 months	„ 1884, vol. ii, 223.
No	No	Yes. Death, 6 months	„ 1884, vol. ii, 223.
....	....	Yes. Death, 3 weeks	„ 1884, vol. ii, 649.
....	....	Yes. Recovery	„ 1884, vol. ii, 651.
No	Yes	....	„ 1884, vol. ii, 1194.
Yes	No	....	Path. Rep., vol. xxxv, 190.
No	No	Yes. Death, 3 months	B. M. J., 1884, 1134.
....	....	Yes. Death, 12 days	„ 1884, vol. ii, 558.
....	....	Symonds' tube	„ 1884, vol. i, 231.
....	....	Yes. Died 7th week	„ 1885, vol. i, 937.
....	Yes	....	„ 1885, vol. i, 594.
Yes	....	Yes. Death, 12 hours	Middlesex Hosp. Rep., 1885.
Yes	....	Yes. Death, 13 days	
Yes	....	Yes. Death, 10 days	
....	....	Yes. Alive, 3 months	Surgical Record, 1885, 8.
Yes	....	Yes. Death, 5 months ..	Cancer Hospital.
Yes	....	Yes. Death, 5 weeks	„ „

THE END.

INDEX.

	Page
Alveolar process. Carcinoma of	23
Antrum	24
Caustics—	
Arsenical paste	9
Chloride of zinc paste	10
Fell's	10
Landolf's	9
Mackey's	10
Zuerine's	11
Gums and antrum	22
„ Age	26
„ Epithelioma of	22
„ Cancrum oris	26
„ Cases—	
Eve's	24
C. Heath's	25
J. Hutchinson's	24
„ Diagnosis	26
„ Epulis	22
„ Operations—	
The Author's	28
C. Heath's	29
„ Origin	22
„ Statistics	22
„ Syphilitic ulcer	27
„ Treatment	27
„ Ulceration	23
Hereditary predisposition	3
Jaw, lower—	
Chondro-sarcoma	49
Enchondroma	46

	Page
Jaw, lower, *continued*—	
Epithelioma	53
Myeloid sarcoma	48
Osteoma	46
Osteo-sarcoma	50
Round-celled sarcoma	51
Spindle-celled sarcoma	47
Cases—	
The Author's	57
Mr. C. Heath's	58
Diagnosis	55
Operations—	
Deadrick's	59
Dupuytren's	59
Mott's	59
Fergusson's	62
Gross'	62
Syme's	63
Pathological specimens	49
Prognosis	56
Treatment	56
Jaw, upper—	
Form of disease. Chondro-sarcoma	32
„ Enchondroma	31
„ Epithelioma	36
„ Fibroma	30
„ Myeloid sarcoma	33
„ Osteoma	31
„ Round-celled sarcoma	34
„ Spindle-celled sarcoma	32
Age	38
Diagnosis	37
Garretson	39
Operations—	
Akoluthus'	39
Author's	42–44
Fergusson's	41
Gensoul's	40
Jameson's	40
Langenbeck's	43
Lane's	44
Liston's	41
Lizars'	39

	Page
Jaw, upper, *continued*—	
Operations, *continued*—	
Rodgers'	40–44
Syme's	41
Prognosis	38
Treatment	39
Lips	1
„ Age	2
„ Cause	1
„ Diagnosis	6
„ Dissemination	8
„ Erysipelas	12
„ Injuries	5
„ Operations—	
Author's	15
Buchanan's	17
Dieffenbach's	20
Erichsen's	17
Leidillot's	21
Syme's	18
„ Pathological specimens	12
„ Plastic operation	16
„ Statistics	1
„ Sex	2
„ Treatment	8
Œsophagus and pharynx	141
„ „ Dissemination	146
„ „ Duration	145
„ „ Diagnosis	150
„ „ „ Auscultation	151
„ „ „ Œsophageal tube....	152
„ „ Origin	144
„ „ Paralysis of chords	149
„ „ Polypus	149
„ „ Pathological specimens	152
„ „ Situation....	142
„ „ Statistics	142
„ „ Symptoms	148
„ „ Treatment	153
„ „ „ Œsophageal tube	155
„ „ „ Symonds'	155

				Page
Œsophagus and pharynx, *continued*—				
„	„	Treatment, *continued*—		
„	„	„	Œsophagotomy	157
„	„	„	Œsophagectomy....	159
„	„	„	Gastrostomy	161
„	„	„	Czerny's case	160
„	„	„	Billroth's case	160
Sarcoma.	Myeloid			33
„	Round-celled			34
„	Spindle-celled			33
Tongue.	Age			73
„	After-treatment....			92
„	Cases			102
„	Diagnosis			80
„	Dissemination			79
„	Etiology			68
„	Heredity			71
„	Ichthyosis			71
„	Locality			76
„	Mortality			91
„	Operations—			
	Division of gustatory nerve			106
	History			96
	Ligature of the lingual artery			107
	Objects			105
	Palliative			106
„	Operations for complete or partial removal—			
	Baker's (M.)....			110
	Barwell's			109
	Billroth's			108
	Gant's			97
	Kocher's			114
	Purcell's			110
	Regnoli's			115
	Sédillot's			113
	Syme's			113
	Whitehead's....			108
	Examination of relative merits			96
	Treatment after			117
	Heath's method of controlling hæmorrhage			100
	Physical character			74

		Page
Tongue, *continued*—		
„	Operations, *continued*—	
	Removal of lymphatic glands	116
„	Sarcoma	65
„	Seat	76
„	Sex	73
„	Statistics	67
„	Syphilitic gumma	70
„	Table of deaths	91
„	„ after operation	91–120
„	Treatment	87
„	Tubercular ulcer	84
„	Tube for feeding after operation	92
„	Warty growths	87
Tonsil.	Barker's (A.) case	138
„	Butlin's	138
„	Beck's	138
„	Hayward's	140
„	Carcinoma	139
„	Sarcoma....	138

HARRISON AND SONS, PRINTERS IN ORDINARY TO HER MAJESTY, ST. MARTIN'S LANE, LONDON.

A

CATALOGUE OF THE PUBLICATIONS

OF

BAILLIÈRE, TINDALL, & COX,

IN

MEDICINE, SCIENCE AND ART.

CONTENTS.

	PAGE
AIDS TO THE CLASSICS	*Back of Title*
ANATOMY	9, etc.
ART, ARTISTIC ANATOMY, ETC.	11, etc.
CHEMISTRY	14, etc.
MEDICINE, SURGERY, AND ALLIED SCIENCES	26, etc.
PHARMACY	30, etc.
STUDENTS' AIDS SERIES	36, etc.
VETERINARY MEDICINE AND SURGERY	39, etc.
PERIODICAL PUBLICATIONS	42
DIRECTORIES	42

LONDON:

20, 21, KING WILLIAM STREET, STRAND.

[PARIS AND MADRID.]

1892.

*** Baillière, Tindall and Cox have special facilities for the disposal of authors' works in the United States and abroad; being in almost daily communication with the principal houses and agents.

AIDS TO THE CLASSICS.

TEXT, TRANSLATION AND COPIOUS NOTES, together with an account of the Author and his works.

Ovid. Metamorphoses. Lib. I. Price 2s.
Cicero. Oratio Prima in L. Catilinam. Price 1s.
Cicero. De Amicitia. Price 2s.
Sallust. De Catilinæ Conjuratione. Price 1s. 6d.
Cæsar. De Bello Gallico. Lib. V. and VI. Price 2s.

TEXT AND NOTES.

Cæsar. De Bello Gallico. Lib. I. Price 1s.
Cæsar. De Bello Gallico. Lib. II. Price 1s.
Cæsar. De Bello Gallico. Lib. VII. Price 1s. 6d.
Horace. Carminum. Book III. Price 1s. 6d.
Horace. Carminum. Book IV. Price 1s.
Livy. Book XXII. Price 1s. 6d.
Ovid. Epistolæ ex Ponto. Lib. I. Price 1s.
Ovid. Tristia. Lib. I. Price 1s. 6d.
Ovid. Metamorphosoen. Lib. II. Price 1s.
Ovid. Metamorphosoen. Lib. XI. Price 1s. 6d.
Cicero. Pro Lege Manilia. Price 1s. 6d.
Cicero. De Senectute. Price 1s.

TRANSLATIONS IN LITERAL ENGLISH.

Cæsar. Gallic War. Book I. Price 1s.
Cæsar. Gallic War. Book II. Price 1s.
Cæsar. Gallic War. Book VII. Price 1s.
Horace. Odes. Books III. and IV. (together). Price 1s.
Ovid. Metamorphoses. Book II. Price 1s.
Ovid. Metamorphoses. Book XI. Price 1s.
Ovid. Pontic Epistles. Book I. Price 1s.
Ovid. Tristia. Book I. Price 1s.
Ovid. Tristia. Book III. Price 1s.
Livy. Book XXII. Price 1s. 6d.
Cicero. Pro Lege Manilia. Price 1s.
Cicero. De Senectute. Price 1s.
Virgil. Æneid. Book I. Price 6d.
Virgil. Æneid. Book V. Price 6d.
Virgil. Æneid. Book XII. Price 9d.
Virgil. Georgics Book II. Price 6d.

ALPHABETICAL INDEX OF AUTHORS.

PAGE

ABERCROMBIE (J.) On Tetany in Young Children 15
ADAMS (W.) Deformities (in Gant's Surgery) 33
ALLAN (F. J.) Aids to Sanitary Science 31
ALLAN (J. H.) Tables of Doses 25
ALLEN (Alfred) Microscopical Science 27
ALLINGHAM (H. W.) Colotomy 8

BAKER (Benson) How to Feed an Infant 28
BANHAM—Veterinary Posological Tables 39
BANNATYNE (A.) Aids to Pathology 29
BARTON (J. K.) The Diagnosis of Syphilis 34
BEACH (Fletcher) Psychological Medicine 31
BERNARD (Claude) and HUETTE'S Text-book of Operative Surgery 33
BLACK (C). Atlas of the Male Organs of Generation 10
BLACKLEY (C. H.) Hay Fever, its Causes and Treatment 22
BODDY (E. M.) History of Salt 32
——— Hydropathy 23
BORTHWICK (T.) The Demography of South Australia 23
BOWDICH (Mrs.) Confidential Chats with Mothers 16
BOWLES (R. L.) On Stertor and Apoplexy 15
BOYD (Stanley) Movable Atlas of the Foot, its Bones and Muscles 11
BRAND (A. T.) Pocket Case Book 10
BRANDT—Treatment of Uterine Disease 22
BROCHARD (J.) Practical Guide for the Young Mother 14
BROWN (George) The Student's Case-book 28
——— Aids to Anatomy 14
——— Aids to Surgery 36
BROWNE (Lennox) The Throat and Nose, and their Diseases 38
——— Movable Atlases of the Throat and Ear 10
BROWNE (W. J.) The Moon, its Influence on Weather 9
BURKE—Tropical Diseases of the Horse 27
BURNESS (A. G.) The Specific Action of Drugs 39
BURTON (J. E.) Translation of Ebstein's Gout 22

CAMERON (Chas.) Microbes in Fermentation, Putrefaction, and Disease ... 13
——— The Cholera Microbe and How to Meet It 15
CAMERON (Sir C. A.) History of the Royal College of Surgeons in Ireland 23
CAMPBELL (C. M.) and HARRIES (A.) Lupus, a Clinical Study 32
——— Skin Diseases of Infancy and Early Life 32
CANTLIE (Jas.) Atlas of the Hand 10
——— Text-book of Naked-Eye Anatomy 9
CARTER (R. Brudenell) Training of the Mind 27
CASSELLS (J. Patterson) Deaf-mutism and the Education of the Deaf-mute 17
CHARCOT (J. M.) Bright's Disease of the Kidneys 24
CHRISTY (T.) Dictionary of Materia Medica 25
CLARKE (Percy) Medical Laws 26
CLARKE (E. H.) The Building of a Brain 13
COCKLE (John) Contributions to Cardiac Pathology 22
——— Insufficiency of the Aortic Valves 22
COFFIN (R. J. Maitland) Obstetrics 28
COOMBE (Russell) Epitome of B. P. 29
COOPER (R. T.) On Vascular Deafness 18
COSGRAVE (C. M.) Botany, Glossary of 13

PAGE

COTTERELL (Ed.) The Pocket Gray, or Anatomist's Vade Mecum 9
COURTENAY (E.) Practice of Veterinary Medicine 39
COZZOLINO (V.) The Hygiene of the Ear 19
CROOKE (G. F.) The Pathology of Tuberculosis 16
CRUISE (F. R.) Hydropathy 23
CULLIMORE (D. H.) Consumption as a Contagious Disease 16
——— The Book of Climates 16

DARLING (W.) Anatomography, or Graphic Anatomy 9
——— The Essentials of Anatomy 9
DAWSON (W. E.) Guide to the Examinations of the Apothecaries' Society 19
DAY (W. H.) Irritable Brain in Children 13
DENNIS (Hy. J.) Second-Grade Perspective Drawing 11
DENNIS (Hy. J.) Third-Grade Perspective Drawing 12
DOLAN (T. M.) Whooping Cough, its Pathology and Treatment 35
DOWSE (T. Stretch) Apoplexy 11
——— Syphilis of the Brain and Spinal Cord 13
——— Skin Diseases from Nervous Affections 32
——— The Brain and the Nerves and Influenza 13
DRAGENDORFF (Prof. G.) Plant Analysis 15
DRYSDALE (C. R.) Nature and Treatment of Syphilis 34
DRYSDALE (John) The Protoplasmic Theory of Life 34
——— Germ Theories of Infectious Diseases 12
DUDGEON (R. E.) The Sphygmograph 31
DUFFEY (G. F.) Note-taking 14
DUTTON (T.) Sea Sickness 32

EBSTEIN (Prof.) The Treatment of Gout 22
ERSKINE (J.) Hygiene of the Ear 18
EVANS (C. W. De Lacy) How to Prolong Life? 18
——— Consumption: its Causes, Treatment, etc. 16
EWART (W.) Cardiac Outlines 14
——— How to Feel the Pulse 31
——— Symptoms and Physical Signs 14

FAU (J.) Artistic Anatomy of the Human Body 11
——— Anatomy of the External Form of Man 11
FIELD (G. P.) Diseases of the Ear 18
FINNY (F. M.) Clinical Fever Chart 21
FITZGERALD (H. P.) Dictionary of British Plants and Flowers 13
FLAXMAN (J.) Elementary Anatomical Studies for Artists 11
FLEMING (G.) Text-book of Veterinary Obstetrics 39
——— Neumann's Parasites of Domestic Animals 39
——— Text-book of Veterinary Surgery 40
——— Actinomykosis 40
——— Roaring in Horses 40
——— Practical Horse-Shoeing 40
——— Animal Plagues, their History, Nature and Treatment 40
——— Contagious Diseases of Animals 40
——— Tuberculosis 40
——— Human and Animal Variolæ 40
——— Heredity and Contagion in the Propagation of Tuberculosis 40
FORD—Ophthalmic Notes 20
FOTHERGILL (J. Milner) Chronic Bronchitis 13
——— Aids to Diagnosis (Semeiological) 18
——— Aids to Rational Therapeutics 38

PAGE
FOTHERGILL (J. Milner) The Physiological Factor in Diagnosis 17
——— The Physiologist in the Household 30
——— Diseases of Sedentary and Advanced Life 28
——— Vaso-Renal Changes 24
FOY (Geo.) Anæsthetics: Ancient and Modern 9
FUCHS (Dr.) The Causes and Prevention of Blindness 20

GANT (F. J.) Text-book of the Science and Practice of Surgery 33
——— Diseases of the Bladder, Prostate Gland, and Urethra 13
——— Examinations by the Conjoint Board 19
——— Students' Surgery 33
GARMANY (J. J.) Surgery on the Cadaver 33
GEMMELL (Wm.) Dermic Memoranda 32
GERSTER (A. G.) Aseptic and Antiseptic Surgery..... 33
GIRAUD-TEULON—Anomalies of Vision 20
GLASGOW-PATTESON (R.) Skin and Hair 32
GOODALL (E.) Microscopical Examination of Brain, Spinal Cord and Nerves 22
GORDON (Chas. A.) Our Trip to Burmah 14
——— Life on the Gold Coast 8
——— Lessons in Military Hygiene and Surgery 23
——— A Manual of Sanitation..... 23
——— Rabies and Hydrophobia 23
——— Reports of the Medical Officers of Chinese Service 15
GORDON (T. Hurd) Aids to Practical Chemistry 36
GORE (Albert A.) Our Services Under the Crown 26
——— Medical History of African Campaigns 8
GREEN (F. W. Edridge) Memory 27
——— Detection of Colour Blindness.. 20
GREENWOOD (J.) Laws Affecting Medical Men 26
GREENWOOD (Major) Aids to Zoology 38
GRESSWELL (J. B. and A. G.) Manual of Equine Medicine and other works 40
GREVILLE (H. Leicester) Student's Hand-book of Chemistry..... 15
GRIFFITHS (A. B.) Micro-Organisms 12
GRIFFITHS (W. H.) Text-book of Materia Medica and Pharmacy 25
——— Notes for Pharmacopœial Preparation..... 30
——— Posological Tables..... 31
GUBB (Alfred S.) Aids to Gynæcology 37
GUBB & GRIFFITHS. Materia Medica and Pharmacy 25
GUBLER (Professor) The Principles and Methods of Therapeutics 34
GUILLEMARD (F. H. H.) Endemic Hæmaturia 20

HAIG-BROWN—Tonsillitis 35
HALTON (R. J.) Short Lectures on Sanitary Subjects 24
HARRIS (Vincent) Manual for the Physiological Laboratory..... 30
HARRIS (V. D.) Kühne's Guide to the Demonstration of Bacteria 12
HARRIES and CAMPBELL (C.M.) Lupus: a Clinical Study..... 32
HARTMANN (Prof.) On Deaf-mutism, Translation by Dr. Cassells..... 17
HAYNES (Stanley) Healthy Homes 23
HAZARD (W. P.) Diseases of Live Stock..... 41
HEIBERG (Jacob) Atlas of Cutaneous Nerve Supply 27
HEMMING (W. D.) Aids to Examinations 36
——— Aids to Forensic Medicine 36
——— Otorrhœa 18
HEPPEL—Analytical Conic Sections..... 21
HERSCHELL (Geo.) Indigestion 21

	PAGE
HEWITT (Frederic) Anæsthetics	9
HILL (J. W.) Principles and Practice of Bovine Medicine	40
——— Management and Diseases of the Dog	40
HIME (T. W.) Cholera: How to Prevent and Resist It	15
——— The Practical Guide to the Public Health Acts	31
HOGG (Jabez) The Cure of Cataract	20
——— The Impairment of Vision from Shock	20
——— Parasitic or Germ Theory of Disease	12
HOPGOOD (T. F.) Notes on Surgical Treatment	34
HORNER (Professor) On Spectacles	20
HOWAT (G. R.) How to Prevent and Treat Consumption	16
HUNTER (Ch.) Manual for Dental Laboratory	17
HUSBAND (H. Aubrey) Handbook of Forensic Medicine	21
——— Aids to the Analysis of Food and Drugs	36
——— Handbook of the Practice of Medicine	26
——— Student's Pocket Prescriber	31
——— Urine	35
HUTCHINSON (Jonathan) Aids to Ophthalmic Medicine and Surgery	37
INCE (J.) Latin Grammar of Pharmacy	30
INTERNATIONAL MEDICAL CONGRESS	24
JAMES (Brindley) Replies to Questions in Therapeutics	38
JAMES (M. P.) Laryngoscopy and Rhinoscopy in Throat Diseases	35
——— Therapeutics of the Respiratory Passages	34
——— Vichy and its Therapeutical Resources	35
JENNINGS (C. E.) On Transfusion of the Blood and Saline Fluids	35
——— Cancer and its Complications	14
JENNINGS (Oscar) On the Cure of the Morphia Habit	27
JESSETT (F. B.) Surgical Diseases of Stomach and Intestines	8
——— Cancer of the Mouth and Tongue	14
JONES (H. Macnaughton) The Diseases of Women	22
——— Subjective Noises in the Head and Ears	18
——— Hints for Midwives	28
——— and STEWART—Handbook of Diseases of the Ear and Naso-Pharynx	19
JONES (H.) Guide to Sanitary Science Exams.	31
JONES (T. Wharton) Blood in Inflammation	24
JUKES-BROWNE (A. J.) Palæontology (in Penning's Field Geology)	21
KEETLEY (C. R. B.) Guide to the Medical Profession	26
——— Surgery of Knee Joint	33
KENNEDY (Hy.) An Essay on Fatty Heart	23
KUHNE—Demonstration of Bacteria	12
LAMBERT (J.) The Germ Theory of Disease	40
LEASK (J. G.) Questions at Medical Science Examinations	20
LEDWICH (J.) Anatomy of Inguinal and Femoral Regions	9
LEONARD (H.) The Pocket Anatomist	9
——— Bandaging	13
——— Hair	22
——— and CHRISTY—Dictionary of Materia Medica	25
LE SUEUR—Analytical Geometry, Straight Line and Circle	21
LETHEBY (Hy.) The Sewage Question	32
LIAUTARD (A.) Animal Castration	40

PAGE

LIAUTARD (A.) Lameness of Horses 40
——— Diseases of Live Stock 40
LITHGOW (R. A. Douglas) From Generation to Generation 23
LOWNE (B. T.) Aids to Physiology 37
LUNN (C.) The Philosophy of Voice 35
——— Artistic Voice in Speech and Song 35
LUPTON (J. I.) The Horse 40

MACDOUGALL (A. M.) The Maybrick Case 21
MACKENZIE (Sir M.) Diseases of the Throat (in Gant's Surgery) 33
MADDICK (Distin) Stricture of the Urethra 32
MAGNÉ (Dr.) How to Preserve the Sight 20
MARTIN (J. W. & J.) Ambulance Work 8
——— Nursing (Questions and Answers) 28
MASSE (J. N.) Text-book of Naked-Eye Anatomy 9
McARDLE (J. S.) Notes on Materia Medica. 26
McBRIDE Anatomical Outlines of the Horse 41
McLACHLAN (John) Anatomy of Surgery 33
MEARS (W. P.) Schematic Anatomy 9
MELDON (Austin) A Treatise on Gout 22
MEYRICK (J. J.) Stable Management in India 41
MILLARD (H. B.) Bright's Disease of the Kidneys 24
MILLER (B. E.) Diseases of Live Stock 41
MOLONY (M. J.) Rupture of the Perineum 32
MOORE (E. H.) Clinical Chart for Hospital and Private Practice 34
MOORE (J. W.) Text Book of Eruptive and Continued Fevers 21
MORDHORST (Carl) Rheumatism. Its Treatment by Electric Massage ... 32
MORGAN (John) The Dangers of Chloroform and Safety of Ether 8
MORRIS (Malcolm) The Skin (in Gant's Surgery) 33
MUCKLEY (W. J.) Student's Manual of Artistic Anatomy 11
——— A Handbook for Painters and Art Students on the Use of Colours 16
MURRAY (R. Milne) Pregnancy 10
MUTER (J.) Key to Organic Materia Medica 25
——— Manual of Analytical Chemistry 15

NALL (S.) Aids to Obstetrics 37
NAPHEYS (G. H.) Handbook of Popular Medicine 18
——— Therapeutics 34
NATIONAL SOCIETY FOR PREVENTION OF BLINDNESS 20
NEUMANN (L. G.) Treatise on Parasites and Parasitic Diseases of Domesticated Animals 40
NORTON (A. T.) Text-book of Operative Surgery 33
——— Osteology for Students 29
——— Affections of the Throat and Larynx 35
——— Movable Atlas of the Skeleton 9

OGSTON On Unrecognised Lesions of the Labyrinth 18
ORMSBY (L. H.) Deformities of the Human Body 17
——— Phimosis and Paraphimosis 30

PALFREY (J.) Atlas of the Female Organs of Generation 10
PALMER (J. F.) How to Bring up Children by Hand 28
PARKE (Surgeon) Climate of Africa (in Cullimore's Book of Climates) 16
PEDDIE (M.) Manual of Physics 30
PENNING (W. H.) Text-book of Field Geology 21

PAGE
PENNING (W. H.) Engineering Geology 21
——— Notes on Nuisances, Drains, and Dwellings 23
PETTENKOFER (Von) Cholera : How to Prevent and Resist It 15
POLITZER (Prof.) Dissections of the Human Ear 19
POWER (Hy.) Movable Atlas of the Eye, and the Mechanism of Vision 10
——— Diseases of the Eye (in Gant's Surgery) 33
POWER (D'Arcy) Handbook for the Physiological Laboratory 30
POYSER (R.) Stable Management of Troop Horses in India 41
PRATT (W.) A Physician's Sermon to Young Men 27
PROCTOR (Richd.) The Stars and the Earth 12
PSYCHOLOGICAL ASSOCIATION'S Handbook for Attendants on the Insane 24
PURVES (L.) Aural Diseases (in Gant's Surgery) 33

RABAGLIATI (A.) The Classification and Nomenclature of Diseases 18
REMSEN (Ira) Principles of Theoretical Chemistry 15
RENTOUL—Reform of Medical Charities 41
REYNOLDS (R. S.) The Breeding and Management of Draught Horses 26
RICHARDS (J. M.) A Chronology of Medicine 26
RICHARDSON (B. W.) The Healthy Manufacture of Bread 21
RIVINGTON (W.) Medical Education and Organization 26
ROBERTSON (William) A Handbook of the Practice of Equine Medicine 40
ROCHE (J.) Hernia and Intestinal Obstruction 23
ROCHET (Chas.) The Prototype of Man, for Artists 12
ROSE (W.) Neuralgia 28
ROTH (M.) Works on Deformities, Gymnastic Exercises, etc. 22
ROTH (W. E.) Elements of School Hygiene 23
——— Theatre Hygiene 23
ROUTH (C. H. F.) Overwork and Premature Mental Decay 29
——— On Checks to Population 31

SARCEY (F.) Mind your Eyes 20
SCHOFIELD (A. T.) Examination Cards—Pathology 20
——— Minor Surgery and Bandaging 33
SEMPLE (R. H.) Diphtheria, Its Causes and Treatment 18
——— Movable Atlas of the Human Body (Neck and Trunk) 10
SEMPLE (C. E. A) Aids to Botany 36
——— Aids to Chemistry 36
——— Aids to Materia Medica 37
——— Aids to Medicine 37
——— Aids to Pharmacy 37
——— Diseases of Children 15
——— The Voice Musically and Medically Considered 35
——— The Pocket Pharmacopœia 29
SEWILL (Hy.) Manual of Dental Surgery 17
——— Dental Caries and the Prevention of Dental Caries 17
SHARMAN (J. S.) Notes on Inorganic Materia Medica 26
SIMON (W.) A Manual of Chemistry 15
SMITH (F.) Manual of Veterinary Hygiene 41
——— Text Book of Comparative Physiology 41
SPARKES (John C. L.) Artistic Anatomy 11
SQUIRE (P. W.) Posological Tables 31
STEVENS (Geo. T.) Nervous Diseases 27
STEWART (W. E. H.) Practitioner's Handbook of Diseases of the Ear 19
STONE (G.) Translation of Politzer's Dissections of the Human Ear 19

PAGE
STRAHAN (J.) Extra-Uterine Pregnancy 28
STUDENTS' AIDS SERIES 36
SUTTON (H. G.) Handbook of Medical Pathology 29
SUTTON (Bland) Dermoids 17
SWEETING (R. D. R.) The Sanitation of Public Institutions 24
SYMINGTON (J.) Anatomy of the Child 9

TELLOR (L. V.) Diseases of Live Stock 41
TEULON (G.) The Functions of Vision 20
THIN (George) Introduction to Practical Histology 23
THOMSON (W.) Transactions of the Academy of Medicine in Ireland 35
THOROWGOOD (J. C.) Consumption ; its Treatment by the Hypophosphites 16
——— The Treatment of Bronchial Asthma 12
——— Aids to Physical Diagnosis 36
THUDICHUM (J. L. W.) The Physiological Chemistry of the Brain 13
——— Aids to Physiological Chemistry 37
——— Aids to Public Health 38
——— Polypus in the Nose 31
——— The Coca of Peru, and its Remedial Principles 16
TICHBORNE (Professor) The Mineral Waters of Europe 27
TIDY (Meymott) and CLARKE (Percy) Medical Laws 26
TIMMS (G.) Consumption ; its Nature and Treatment 16
——— Alcohol in some Clinical Aspects, a Remedy, a Poison 8
TOMSON—Medical Electricity 19
TRANSACTIONS of Royal Academy of Medicine in Ireland 42
TREVES (F.) Annals of Surgery 33
TUCKEY (C. Lloyd) Psycho-Therapeutics 24
TURNER (Dawson) Manual of Medical Electricity 19
TYSON (J.) The Urine, a Guide to its Practical Examination 35

UNDERWOOD (Arthur S.) Aids to Dental Surgery 36
——— Aids to Dental Histology 36
USSHER (J. F.) Alcoholism 8

WAGSTAFFE (W. W.) Atlas of Cutaneous Nerve Supply 27
WALLACE (J.) Localised Peritonitis 29
WALSHAM and POWER—Surgical Pathology 33
WHERRY (Geo.) Clinical Notes on Nerve Disorders 27
WILLIAMS (Maurice) Materia Medica 25
WILLIAMSON (J. M.) Ventnor and the Undercliff 16
WILLSON (A. Rivers) Chemical Notes for Pharmaceutical Students 15
WILSON (J.) A Manual of Naval Hygiene 24
WINDLE (B. C. A.) Proportions of the Human Body 12
WINSLOW (L. S. Forbes) Fasting and Feeding 20
——— Aids to Psychological Medicine 37
WITKOWSKI (G. J.) Movable Atlases of the Human Body 10

AN

ALPHABETICAL INDEX OF WORKS,

IN

MEDICINE, SURGERY, SCIENCE AND ART,

PUBLISHED BY

BAILLIÈRE, TINDALL, & COX.

Abdominal Surgery. Colotomy, Inguinal, Lumbar or Transverse; for Cancer or Stricture with Ulceration of the large Intestine. By HERBERT W. ALLINGHAM, F.R.C.S., Surgeon to the Great Northern Hospital, Assistant Surgeon to St. Mark's Hospital for Diseases of the Rectum, Surgical Registrar to St. George's Hospital. With six plates and numerous illustrations. Price 6s.

Abdominal Surgery. The Surgical Diseases and Injuries of the Stomach and Intestines. By F. BOWREMAN JESSETT, F.R.C.S. Eng., Surgeon to the Cancer Hospital. Copiously illustrated. Price 7s. 6d.

Africa. A Contribution to the Medical History of our West African Campaigns. By Surgeon-Major ALBERT A. GORE, M.D., Sanitary Officer on the Staff. Price 10s. 6d.

Africa. Life on the Gold Coast. A Description of the Inhabitants, their Modes and Habits of Life; Hints to Travellers and others in Western Africa. By Surgeon-General GORDON, M.D., C.B., Hon. Physician to the Queen. Price 2s. 6d.

Alcohol, in some Clinical Aspects: A Remedy, a Poison. By GODWIN TIMMS, M.D., M.R.C.P. Lond., Senior Physician to the North London Consumption Hospital. Price 1s.

Alcoholism and its Treatment. By JOSEPH FRANCIS USSHER, M.D., L.A.H. Dub. [*In the Press.*

Ambulance Work. Questions and Answers on "First Aid to the Injured." By JOHN W. MARTIN, M.D., and JOHN MARTIN, F.R.C.S. Seventeenth thousand. Price 1s. net.

Anæsthetics. The Dangers of Chloroform and the Safety and Efficiency of Ether in Surgical Operations. By JOHN MORGAN, M.D., F.R.C.S. Second thousand, price 2s.

Anæsthetics. Selected Methods in the Administration of Nitrous Oxide and Ether. By FREDERIC HEWITT, M.A., M.D. Cantab., Lecturer on Anæsthetics at the London Hospital. Price 2s. 6d.

Anæsthetics: Ancient and Modern. Their Physiological Action, Therapeutic Use, and Mode of Action. By GEORGE FOY, F.R.C.S., Surgeon to the Richmond Hospital. Price 3s. 6d. net.

Anatomography; or, Graphic Anatomy. A new method of grasping and committing to memory the most difficult points required of the student. By W. DARLING, M.D., F.R.C.S. Eng., Professor of Anatomy in the University of New York. Price 1s.

Anatomy. Aids to Anatomy. By GEORGE BROWN, M.R.C.S., Gold Medallist, Charing Cross Hosp. Price 1s. 6d. cloth, 1s. sewn.

Anatomy. Text-Book of Naked-Eye Anatomy. With 113 Steel Plates, designed under the direction of Professor MASSE. Text by JAS. CANTLIE, M.B., C.M. (Honours), F.R.C.S., Charing Cros Hospital. Third edition. Plain, 25s., coloured, 50s., half calf.

Anatomy. The Essentials of Anatomy. A Text-book for Students and a book of easy reference to the Practitioner. By W. DARLING, M.D., F.R.C.S., and A. L. RANNEY, M.D. 12s. 6d.

Anatomy. The Pocket Gray, or Anatomist's Vade-Mecum. Compiled from the works of Gray, Ellis, Holden, and Leonard. By E. COTTERELL, L.R.C.P., M.R.C.S. Enlarged edition, 3s. 6d.

"A marvellous amount of information condensed into a remarkably small space."—*Med. Press.*

Anatomy. The Pocket Anatomist. By H. LEONARD, M.D. Enlarged Edition, illustrated. Price 3s. 6d.

Anatomy. Schematic Anatomy; or Diagrams, Tables and Notes treating of the Association and Systematic arrangement of Structural Details of Human Anatomy. By WILLIAM P. MEARS, M.B., Professor and Examiner in Anatomy at the University of Durham. Profusely illustrated. Price 7s. 6d.

Anatomy. Anatomy of the Child. With 14 coloured plates and 33 woodcuts. By JOHNSON SYMINGTON, M.D., F.R.S.E., F.R.C.S.E., Lecturer on Anatomy, Edinburgh. Price 42s.

Anatomy of the Inguinal and Femoral Regions in Relation to Hernia. By E. LEDWICH, Lecturer on Anatomy in the Ledwich School of Medicine, Dublin. Price 3s.

Anatomy. Human Anatomy and Physiology, illustrated by a series of Movable Atlasses of the Human Body, showing the relative positions of the several parts, by means of Superposed Coloured Plates, from the designs of Prof. G. J. WITKOWSKI, M.D. Each part complete in itself.

Part I.—Neck and Trunk. With Text Descriptive and Explanatory of the physiology and functions of the several parts. By ROBERT HUNTER SEMPLE, M.D., F.R.C.P. Lond. Price 7s. 6d.
The same enlarged to Life Size. Price £2 2s.

Part II.—Throat and Tongue, showing the Mechanism of Voice, Speech, and Taste. Text by LENNOX BROWNE, F.R.C.S. Ed. Price 7s. 6d.

Part III.—The Female Organs of Generation and Reproduction. Text by JAMES PALFREY, M.D., M.R.C.P. Lond., late Senior Obstetric Physician, London Hospital. Price 7s. 6d.

Part IV.—The Eye and the Apparatus of Vision. Text by HENRY POWER, F.R.C.S., Senior Ophthalmic Surgeon to St. Bartholomew's Hospital. Price 7s. 6d.

Part V.—The Ear and Teeth. The Mechanism of Hearing, and of Mastication. Text of the Ear by LENNOX BROWNE, F.R.C.S.E. The Teeth by H. SEWILL, M.R.C.S. Price 7s. 6d.

Part VI.—The Brain and Skull. (Cerebrum, Cerebellum, and Medulla Oblongata.) Text by T. STRETCH DOWSE, M.D., F.R.C.P. Ed. Price 7s. 6d.

Part VII.—The Male Organs of Generation. Text by D. CAMPBELL BLACK, M.D., Physician to the Glasgow Royal Infirmary. Price 7s. 6d.

Part VIII.—The Skeleton and its Articulations, showing the Bones and Ligaments of the Human Body and Limbs. Text by A. T. NORTON, F.R.C.S. Price 7s. 6d.

Part IX.—The Hand; its Bones, Muscles and Attachments. Text by JAS. CANTLIE, M.B., F.R.C.S. Price 7s. 6d.

Part X.—The Foot; its Bones, Muscles and Attachments. Text by STANLEY BOYD, M.B., B.S. Lond., F.R.C.S., Assistant Surgeon, Charing Cross Hospital. Price 7s. 6d.

Part XI.—Progress of Gestation. A Synopsis of Practical Obstetrics. Text by R. MILNE MURRAY, F.R.C.P. Edin., M.B. Edin. Price 7s. 6d.

The Set of Eleven Parts, complete in cloth-covered Box, with lock and key, £4 net.

*** No such simple, reliable, and comprehensive method of learning the several parts, positions, and functions of the body has hitherto been attempted; the entire Series being unique, will be most valuable to the Teacher, the Student, and to all who wish to become acquainted with the anatomy and physiology of the human economy.

Apoplexy. On Stertor, Apoplexy, and the Management of the Apoplectic State. By ROBERT L. BOWLES, M.D., F.R.C.P. Lond., Consulting Physician to the Victoria Hospital, and to the St. Andrew's Convalescent Hospital, Folkestone. With 13 Illustrations. Price 4s. 6d.

"The information is both practical and useful, and based on extensive clinical and experimental investigation. The principles advocated by the author deserve to be more widely known and acted on than they are at present."—*British Medical Journal.*

"The author has produced a book which is at present the only authority on the subject."—*Medical Press.*

Apoplexy. Diagnosis and Treatment of Apoplexy. By T. STRETCH DOWSE, M.D., F.R.C.P.E., formerly Medical Superintendent, Central London Sick Asylum. Price 1s.

Army Hygiene. Lessons in Military Hygiene and Surgery. By Surgeon-General GORDON, M.D., C.B., Hon. Physician to H.M. the Queen. Illustrated. Price 10s. 6d.

Artistic Anatomy. Anatomy of the External Forms of Man, for the use of Artists, Sculptors, etc. By Dr. J. FAU. Used at the Government School of Art, South Kensington. Twenty-nine plates. Folio. New edition. 30s. coloured, 15s. plain.

Artistic Anatomy. Elementary Anatomical Studies of the Bones and Muscles, for Students and Schools, from the drawings of J. FLAXMAN, R.A. Lately used as a Text-book in the Art Schools at South Kensington. 20 plates, with Text, price 2s.

Artistic Anatomy. The Student's Manual of Artistic Anatomy. With 25 etched plates of the bones and surface muscles of the human figure. By W. J. MUCKLEY. Used at the Government School, South Kensington. Second edition. Price 5s. 6d.

Artistic Anatomy. Elementary Artistic Anatomy of the Human Body. From the French of Dr. FAU. With English Text. Used at the Government School of Art, South Kensington. Price 5s.

Artistic Anatomy. Description of the Bones and Muscles that influence the External Form of Man. With 43 plates. By JOHN C. L. SPARKES, Principal of the National Art Training School, South Kensington. Adopted as a text-book at the Government Art Schools. Price 7s. 6d.

Artistic Drawing. Second Grade Perspective (Theory and Practice), containing 21 block illustrations, 20 plates, and many examination exercises. Used at the Government Science and Art Schools. By H. J. DENNIS, Art Master, Lambeth School of Art, Dulwich College, etc. Price 2s. 6d.

Artistic Drawing. Third Grade Perspective, for the use of Art Students. By H. J. DENNIS. Used at the Science and Art Schools. In two parts, 7s. 6d. each. Part 1, Angular and Oblique Perspective. Part 2, Shadows and Reflections; or, half-bound leather in one vol., price 15s.

Artistic Drawing. The Prototype of Man, giving the natural laws of Human proportion in both sexes. A manual for artists and professors of drawing. By CHAS. ROCHET, of Paris. Price 1s.

Artists' Colours. Their Preparation, Uses, etc. (See Colours.)

Artistic Drawing. A Manual of the Proportions of the Human Body for Artists. By BERTRAM C. A. WINDLE, M.A., M.D., D.SC., Queen's Professor of Anatomy in the Mason's College, Professor of Anatomy to the Royal College of Artists, and Lecturer in the Municipal School of Birmingham. [*In the Press.*

Asthma. On Bronchial Asthma—its Causes, Pathology and Treatment. Lettsomian Lectures. By J. C. THOROWGOOD, M.D., F.R.C.P. London, Senior Physician to the City of London Hospital for Diseases of the Chest. Third edition. Price 3s.

Astronomy. The Stars and the Earth; or, Thoughts on Time Space, and Eternity. With Notes by R. A. PROCTOR, B.A., Fourteenth thousand. Price 1s.

Ataxia. Nervous Affections associated with the Initial or Curative Stage of Locomotor Ataxy. By T. STRETCH DOWSE, M.D., F R.C.P.E. Second Edition. Price 2s.

Aural Diseases. (See Ear.)

Bacteriology. Researches in Micro-Organisms, including recent Experiments in the Destruction of Microbes in Infectious Diseases, etc. By A. B. GRIFFITHS, Ph.D., F.C.S., F.R.S.E. With 52 Illustrations. Price 6s.

"An enormous amount of material the author has taken great trouble to collect a large number of the references bearing on the points he mentions."—*Lancet.*

"The work . . . may be recommended to those who wish to have in a convenient form a very large number of facts and references relating to bacteria."—*British Medical Journal.*

Bacteriology. The Germ Theories of Infectious Diseases. By JOHN DRYSDALE, M.D., F.R.M.S., President of the Liverpool Microscopical Society. Price 1s.

Bacteriology A Parasitic or Germ Theory of Disease: the Skin, Eye, and other affections. By JABEZ HOGG, M.R.C.S., Consulting Surgeon to the Royal Westminster Ophthalmic Hospital. Second edition, price 2s. 6d.

Bacteriology. Guide to the Demonstration of Bacteria in the Tissues. By Dr. H. KÜHNE, of Wiesbaden. Translated and Edited by VINCENT DORMER HARRIS, M.D. Lond., F.R.C.P., Demonstrator of Physiology at St. Bartholomew's Hospital. Price 2s. 6d.

Bacteriology. Microbes in Fermentation, Putrefaction, and Disease. By CHARLES CAMERON, M.D., LL.D. M.P. Price 1s.
Professor Tyndall, F.R.S., writes: "Matthew Arnold himself could not find fault with its lucidity, while as regards knowledge and grasp of the subject I have rarely met its equal."

Bandaging. A Manual for Self-instruction. By C. H. LEONARD, M.A., M.D., Professor of Diseases of Women in the State College, Michigan. With 139 illustrations. Price 3s. 6d.

Bladder. On Diseases of the Bladder, Prostate Gland, and Urethra. By F. J. GANT, F.R.C.S., Senior Surgeon to the Royal Free Hospital. Fifth Edition. Price 12s. 6d.

Botany. A Dictionary of British Plants and Flowers; their names, pronunciation, origin, etc. By H. P. FITZGERALD. Price 2s. 6d.

Botany. Aids to Botany. Outlines of the Elementary Facts, including a Description of some of the most important Natural Orders. By C. E. ARMAND SEMPLE, B.A., M.B. Cantab., M.R.C.P. Lond. Price 2s. 6d. cloth; 2s. paper wrapper.

Botany. The Student's Botany. Encyclopædic Glossary. By E. MACDOWEL COSGRAVE, M.D., Lecturer on Botany, Carmichael College. Price 2s. 6d.

Brain. The Building of a Brain. By E. H. CLARKE, M.D. (author of "Sex in Education"). Price 5s.
"Carefully and elegantly written, and full of sound physiology."—*Lancet.*

Brain. On Irritable Brain in Children. By W. H. DAY, M.D., M.R.C.P. Lond., Physician to the Samaritan Hospital for Women and Children. Price 1s. 6d.

Brain. The Physiological and Chemical Constitution of the Brain, based throughout on original researches. By J. L. W. THUDICHUM, M.D., F.R.C.P. Lond. Price 10s. 6d.

Brain. Syphilis of the Brain and Spinal Cord, showing the part which this agent plays in the production of Paralysis, Epilepsy, Insanity, Headache, Neuralgia, Hysteria, and other Mental and Nervous Derangements. By T. STRETCH DOWSE, M.D., F.R.C.P. Ed. Second edition, illustrated. Price 5s.

Brain. On Brain and Nerve Exhaustion (Neurasthenia), and on the Exhaustions of Influenza. By the same author. Price 2s. 6d.

Bronchitis. Chronic Bronchitis: its Forms and Treatment. By J. MILNER FOTHERGILL, M.D. Ed., M.R.C.P. Lond. Second Edition. Price 4s. 6d.
"It bristles with valuable hints for treatment."—*British Medical Journal.*
"The pages teem with suggestions of value."—*Philadelphia Medical Times.*

Burmah. Our Trip to Burmah, with Notes on the Ethnology, Geography, Botany, Habits and Customs of that Country, by Surgeon-General GORDON, C.B., M.D., Physician to the Queen. Illustrated with numerous Photographs, Maps, Coloured Plates, and Sketches in gold by native Artists. Price 21s.

"We lay down this book, impressed with its many beauties, its amusing sketches and anecdotes, and its useful and instructive information."—*The Times.*

Cancer and its Complications. The Local Origin of Cancer from the Various Parts of the Body, Preventive and Curative Treatment, etc. By C. E. JENNINGS, F.R.C.S. Eng., M.S., M.B. 3s. 6d.

Cancer of the Mouth, Tongue and Œsophagus. By F. BOWREMAN JESSETT, F.R.C.S. Eng., Surgeon to the Cancer Hospital.

Case Books. A Pocket Case-book for Practitioners and Students. With diagrams, charts, and suggestions for note-taking. By ALEX. THEODORE BRAND, M.D., C.M. Bound in limp leather cover. Price 4s. Loose sheets per doz. 1s., 50 3s. 6d. 100 6s.

Case Taking. Cardiac Outlines for Clinical Clerks and Practitioners; and First Principles in the Physical Examination of the Heart for the Beginner. By W. EWART, M.D., F.R.C.P. Lond., Physician to St. George's Hospital, London. With fifty illustrations. Intended as a Pocket Companion at the Bedside. The outlines are designed to illustrate the methods and the results of the physical examination of the heart in health and in disease, and to assist the student in recording his clinical observations.

*** A supply of thoracic and cardiac outlines ($4\frac{1}{2}$ by $3\frac{3}{4}$ inches), on gummed paper, will be included in each copy. Price 5s. 6d.

Case Taking. Symptoms and Physical Signs, a formulary for medical note-taking, with examples. By the same author. Price 1s.

Case Books. Student's Case-book. For recording cases as seen, with full instructions for methodizing clinical study. By GEORGE BROWN, M.R.C.S., Gold Medallist, Charing Cross Hospital. Fourth thousand, cloth. Price 1s. net.

Case-book. Suggestions for a plan of taking notes in medical cases. By GEO. F. DUFFEY, M.D. Dublin. Price 6d.

Chemistry. Aids to Chemistry. By C. E. ARMAND SEMPLE, B.A. M.B. Cantab., M.R.C.P. Lond.

Part I.—Inorganic. The Non-metallic Elements. Price 2s. 6d., cloth; 2s. paper wrapper.

Part II.—Inorganic. The Metals. Price 2s. 6d. cloth; 2s. paper.

Part III.—Organic. Cloth, 2s. 6d.; paper, 2s.

Part IV.—Tablets of Chemical Analysis. Price 1s. 6d. and 1s.

"Students preparing for Matriculation at the London University, and other Examinations, will find it simply invaluable."—*Students' Journal.*

Chemistry. A Manual of Chemistry; a complete guide to Lectures and Laboratory work for beginners in Chemistry, and a text-book for students in Medicine and Pharmacy. By W. SIMON, Ph.D., M.D., Professor of Chemistry. Sixteen woodcuts and coloured plates representing 56 Chemical reactions. Price 15s

Chemistry. Plant Analysis, Quantitative and Qualitative. By G. DRAGENDORFF, Professor of Chemistry and Pharmacy in the University of Dorpat. Translated by HY. G. GREENISH, A.I.C. Price 7s. 6d.

Chemistry. The Principles of Theoretical Chemistry, with special reference to the Constitution of Chemical Compounds. By IRA REMSEN, M.D., Ph.D., Professor of Chemistry in the John Hopkins University. Fourth Edition. [*In the Press.*

Chemistry. The Student's Hand-book, with Tables and Chemical Calculations. By H. LEICESTER GREVILLE, F.I.C., F.C.S. Second Edition. Price 6s.

Chemistry. Chemical Notes for Pharmaceutical Students. By A. RIVERS WILLSON. Second Edition. Price 3s. 6d.

"Of exceeding value to students going up for examination."—*Pharmaceutical Journal.*

Chemistry. A Short Manual of Analytical Chemistry for Laboratory Use. By JOHN MUTER, Ph.D., M.A., F.C.S. Second Edition. [*In the Press.*

Children. The Diseases of Children: their History, Causes and Treatment. By C. E. ARMAND SEMPLE, B.A., M.B. Cantab., M.R.C.P. Lond., Physician to the North-Eastern Hospital for Children. Price 6s.

Children. Confidential Chats with Mothers on the healthy rearing of Children. By Mrs. BOWDICH. Price 2s.

Children. On Tetany in Young Children. By J. ABERCROMBIE, M.D., M.R.C.P. Lond. Price 2s.

China. Reports of the Medical Officers of the Chinese Imperial Maritime Customs Service, from 1871 to 1882, with the History of Medicine in China. Compiled by Surgeon-General GORDON, M.D., C.B., Physician to Her Majesty the Queen. Price 21s.

Cholera: How to Prevent and Resist it. By Professor VON PETTENKOFER and T. WHITESIDE HIME, A.B., M.B. Second edition. Illustrated. Price 3s. 6d.

Cholera. The Cholera Microbe and How to Meet It. Read at the Congress of the British Medical Association. By CHARLES CAMERON, M.D., LL.D., M.P. Price 1s.

Climatology. Ventnor and the Undercliff. By J. M. WILLIAMSON, M.D., M.B. Ed., Hon. Surgeon to the National Hospital for Consumption. Second edition, price 1s.

Climatology. The Demography of South Australia. By THOS. BORTHWICK, M.D. Ed., Medical Officer of Health for South Australian District. With three plates. Price 2s. 6d. 1891.

Climatology. The Book of Climates in all Lands. A Handbook for Travellers, Invalids, and others in search of Health and Recreation. By D. H. CULLIMORE, M.D., M.R.C.P. Lond., Surgeon in H.M. Indian Army (retired). With a chapter on the Climate of Africa as it affects Europeans by Surgeon PARKE, D.C.L. Second edition, cloth limp. Price 4s. 6d.

"A very useful book."—*The Graphic.*
"There is much which entitles it to a large circulation."—*Westminster Review.*
"A work of supreme interest to the traveller in search of health."—*Freeman's Journal.*

Coca. The Coca of Peru, its Remedial Principles, and Healing Powers. By J. L. W. THUDICHUM, M.D., F.R.C.P. Price 1s.

Colours. A Hand-book for Painters and Art Students, on the use of Colours, Vehicles, etc. By W. J. MUCKLEY. Price 3s. 6d.

Consumption. Consumption as a Contagious Disease; the Merits of the Air of Mountains and Plains. By D. H. CULLIMORE, M.D., M.R.C.P. Lond., formerly H.M. Indian Army. Price 5s.

Consumption. Consumption and its Treatment by the Hypophosphites. By JOHN C. THOROWGOOD, M.D., F.R.C.P. Lond., Physician to the City of London Hospital for Diseases of the Chest, Victoria Park. Third edition, price 2s. 6d.

Consumption. A Re-investigation of its Causes. By C. W. DE LACY EVANS, M.R.C.S. Eng. Price 2s. 6d.

Consumption. How to Prevent and Treat Consumption. By G. RUTLAND HOWAT, B.A. Lond. Price 2s. 6d.

Consumption. An Essay on Consumption: Its True Nature and Successful Treatment. By GODWIN W. TIMMS, M.D. Lond. Second edition, revised and enlarged, price 10s. 6d.

Consumption. Tuberculosis from a Sanitary and Pathological Point of View. By G. FLEMING, C.B., F.R.C.V.S., President of the Royal College of Veterinary Surgeons. Price 1s.

Consumption. The Pathology of Tuberculosis (Pulmonary Tuberculosis and Tubercular Phthisis). A course of Past Graduate Lectures delivered at Queen's Hospital, Birmingham, 1891. By GEO. F. CROOKE, M.D., Physician and Pathologist to Queen's Hospital, and Lecturer on Pathology in Queen's College. Price 2s. 6d.

Deafness. (See Ear.)

Deaf-mutism. On the Education of Deaf-mutes by Lip-Reading and Articulation. By Professor HARTMANN. Translated by Dr. PATTERSON CASSELLS. Price 7s. 6d.

"The instruction of deaf-mutes is here rendered easy."—*Athenæum.*
"We can honestly recommend it to anyone seeking for knowledge."—*The Lancet.*

Deformities. The Nature and Treatment of Deformities of the Human Body. By LAMBERT H. ORMSBY, M.B. Dub., Surgeon to the Meath Hospital and Dublin Infirmary. Price 5s.

Dental Surgery. A Manual of Dental Surgery: Including Special Anatomy and Pathology. For Students and Practitioners. By HENRY SEWILL, M.R.C.S., L.D.S. Eng. Third edition, with upwards of 200 illustrations, chiefly original, price 10s. 6d.

Dental. Dental Caries and the Prevention of Dental Caries. By HENRY SEWILL, M.R.C.S. and L.D.S. Eng. Second edition. Price 2s. 6d.

Dental. Aids to Dental Surgery. By ARTHUR S. UNDERWOOD, M.R.C.S., L.D.S. Eng. Price 2s. 6d. cloth; 2s. paper.

Dental. Aids to Dental Histology. By the same Author. Illustrated. Price 2s. 6d. cloth; 2s. paper wrapper. 1892.

Dental. Journal of the British Dental Association. Monthly, price 6d.

Dental. Manual for the Dental Laboratory. A Practical Guide to its Management, Economy, and Methods of Manipulation. By CHARLES HUNTER, Author of "A Treatise on Mechanical Dentistry." Price 5s.

Dermatology. (See Skin.)

Dermoids. A Course of Lectures delivered at the Royal College of Surgeons, England, 1889, on "Evolution in Pathology." By J. BLAND SUTTON, F.R.C.S., Hunterian Professor, Royal College of Surgeons. Price 3s., profusely illustrated.

"We commend the study of this book to all interested in the elucidation of pathological problems."—*The Lancet.*

Diagnosis. The Physiological Factor in Diagnosis. By J. MILNER FOTHERGILL, M.D., M.R.C.P. Lond. Second edition. Price 7s. 6d.

"An exceedingly clever and well-written book, put together in a very plain, practical, and taking way."—*Edinburgh Medical Journal.*

Diagnosis, Aids to. Three Parts. Price 1s. and 1s. 6d. each.
Part I.—Semeiological. By J. Milner Fothergill, M.D.
Part II.—Physical. By J. C. Thorowgood, M.D., F.R.C.P.
Part III.—What to Ask the Patient. By J. Milner Fothergill, M.D.

"A mine of valuable information."—*Edinburgh Medical Journal.*

New edition. Containing the three parts. Edited by Dr. Thorowgood. In one volume. Price 3s. 6d. cloth.

Diphtheria. Diphtheria, its Causes, Pathology, Diagnosis, and Treatment. By R. Hunter Semple, M.D., F.R.C.P. Lond. Second edition, price 2s. 6d.

Diseases. The Classification and Nomenclature of Diseases. By A. Rabagliati, M.A., M.D., Senior Surgeon Bradford Infirmary, Surgeon to the Children's Hospital. Price 2s. 6d.

Domestic Medicine. Handbook of Popular Medicine for family instruction, colonists and others out of reach of medical aid. By G. H. Napheys, A.M., M.D. With movable plate and 100 illustrations. Price 7s. 6d.

Diet. How to Prolong Life. Showing the Diet and Agents best adapted for a lengthened prolongation of existence. By C. W. De Lacy Evans, M.R.C.S. Second edition. Price 5s.

(See also Food.)

Diseases of Women. (See Gynæcology.)

Dyspepsia. (See Indigestion.)

Ear. Diseases of the Ear. By George P. Field, M.R.C.S., Aural Surgeon to St. Mary's Hospital, and Lecturer on Aural Surgery. Fourth edition, rewritten and brought up to date. [*In the Press.*

Ear. On Unrecognised Lesions of the Labyrinth. Being the Cavendish Lecture for 1890. By Alex Ogston, M.D., C.M., Regius Professor of Surgery in the University of Aberdeen. Illustrated. Price 1s.

Ear. On Vascular Deafness. By Robert J. Cooper, M.D., Trinity College, Dublin. Price 3s. 6d.

Ear. Otorrhœa; or, Discharge from the Ears: Causes and Treatment. By W. Douglas Hemming, F.R.C.S. Ed. Price 1s.

Ear. Subjective Noises in the Head and Ears. Their Etiology, Diagnosis and Treatment. By H. Macnaughton Jones, M.D., F.R.C.S. I. and E., Fellow of the Medical, Obstetrical, Gynæcological and Ophthalmological Societies of London. Profusely illustrated, price 4s. 6d.

Ear. The Hygiene of the Ear. By CAVALIERE VINCENZO COZZOLINO, Professor in the Royal University of Naples, and Director of the Hospital Clinic for Diseases of the Ear, Nose, and Throat. Translated from the fifth Italian edition by James Erskine, M.A., M.B. [*In the Press.*

Ear. Practitioner's Hand Book of Diseases of the Ear and Naso-Pharynx. By Dr. H. MACNAUGHTON JONES and Mr. W. E. H. STEWART, F.R.C.S.E. Fourth edition, with plates and numerous woodcuts. Price 10s. 6d.

Ear. The Anatomical and Histological Dissection of the Human Ear, in its Normal and Diseased Conditions. By Professor POLITZER of Vienna. Translated at the author's request by GEORGE STONE, F.R.C.P. Ed. Profusely illustrated. Price 10s. 6d.

Electricity. A Manual of Practical Medical Electricity. By DAWSON TURNER, B.A., M.D., F.R.C.P. Ed., M.R.C.P. Lond.

[*In the Press.*

In this work an endeavour has been made to place before the student and practitioner a trustworthy modern account of and guide in the practice of medical and surgical electricity, in a manner as free as possible from unnecessary theory and technicality.

It is hoped that the practitioner, with this book at his elbow, will be enabled not only to select the apparatus best suited for his purpose, but also to understand, manage and apply it in a rational, as opposed to a purely mechanical or empirical, manner.

The work has been divided into two parts: the first treats of electro-physics, and includes an account of static, galvanic and Faradic electricity, the secondary cell, and the current from a dynamo. The second part of electro-diagnosis, electro-surgery and electro-therapeutics. The book does not presuppose previous electrical studies.

Electricity. Electricity in General Practice. By W. BOLTON TOMSON, M.D. Price 2s. 6d.

Etiquette. A few Rules of Medical Etiquette. By a L.R.C.P. Lond. Price 1s.

Examinations. Aids to Examinations. By W. D. HEMMING, F.R.C.S. Ed., and H. AUBREY HUSBAND, M.B., F.R.C.S. Being Questions and Answers on Materia Medica, Medicine, Midwifery, Pathology, and Forensic Medicine. Price 1s. 6d. cloth, 1s. paper.

Examinations. A Guide to the Examinations of the conjoint Board in England and for the Fellowship of the College of Surgeons, with Examination Papers. By F. J. GANT, F.R.C.S. Sixth edition, revised and enlarged. Price 5s. net.

Examinations. A Guide to the Examinations of the Apothecaries' Society of London with Questions, Tables on Materia Medica, etc. By W. E. DAWSON, L.S.A. Second edition. Price 2s. 6d.

"May be studied with great advantage by a student, shortly before presenting himself for examination."—*British Medical Journal.*

Examinations. Examination Questions on the Medical Sciences, including the Army, Navy and University Examinations. Selected and arranged by JAMES GREIG LEASK, M.B. Abdn. Second edition. Price 2s. 6d.

"Dr. Leask's questions are particularly suitable for pure examination study. Students should test themselves thereby."—*British Medical Journal.*

Examination Cards: Questions and Answers. By A. T. SCHOFIELD, M.D. Pathology, 2 sets, 9d. each, net. Minor Surgery, Bandaging, etc., 9d., net.

Eye. Aids to Ophthalmic Medicine and Surgery. By J. HUTCHINSON, jun., F.R.C.S., Ophthalmic Surgeon to the Great Northern Hospital. Cloth, 2s. 6d.; paper, 2s.

Eye. Ophthalmic Notes. A Pocket Guide to the Nature and Treatment of Common Affections of the Eye. By A. VERNON FORD, M.R.C.S. Eng., L.K.Q.C.P. Ire. Price 2s. 6d.

Eye. The Detection of Colour Blindness, from a practical point of view. By F. W. EDRIDGE-GREEN, M.D., F.G.S., Author of "Memory," etc., etc. Price 1s.

Eye. The Cure of Cataract and other Eye Affections. By JABEZ HOGG, M.R.C.S., Consulting Surgeon to the Royal Westminster Ophthalmic Hospital. Third edition. Price 2s. 6d.

Eye. On Impairment or Loss of Vision from Spinal Concussion or Shock. By the same Author. Price 1s. 6d.

Eye. The Functions of Vision and its Anomalies. By Dr. GIRAUD TEULON. Translated by LLOYD OWEN, F.R.C.S.I., Surgeon to the Midland Eye Hospital, Ophthalmic Surgeon to the Hospital for Sick Children, Birmingham. Price 5s.

Eye. Movable Atlas of the Eye and the Mechanism of Vision. By Prof. G. J. WITKOWSKI. Price 7s. 6d. (See Anatomy.)

(*The following four works have been translated for the National Society for the Prevention and Cure of Blindness.*)

Mind your Eyes. By F. SARCEY. Price 2s. 6d.

The Causes and Prevention of Blindness. By Professor FUCHS, University of Liége. Price 7s. 6d.

How to Preserve the Sight. By Dr. MAGNÉ. Price 6d.

On Spectacles, their History and Uses. By Prof. HORNER. Price 6d.

Fasting and Feeding, Psychologically considered. By L. S. FORBES WINSLOW, M.B. Cantab., D.C.L. Oxon. Price 2s.

Fever. On the Endemic Hæmaturia of Hot Climates, caused by the presence of Bilharzia Hæmaturia. By F. H. H. GUILLEMARD, M.A., M.D., F.R.G.S. Price 2s.

Fever. Text-Book of the Eruptive and Continued Fevers. By JOHN WILLIAM MOORE, B.A., M.D., M. Ch. Univ. Dub., F.R.C.P.I., Joint Professor of Practice of Medicine in the Schools of Surgery of the Royal College of Surgeons in Ireland, Physician to the Meath Hospital, Dublin, Consulting Physician to Cork Street Fever Hospital, Dublin, ex-Scholar and Diplomate in State Medicine of Trinity College, Dublin. Price 15s.

Fever Charts. Daily Clinical Fever Charts, to record the progress of a case of continued or eruptive fever. By F. MAGEE FINNY, M.D. Price 5s.

Food. Aids to the Analysis of Food and Drugs. By H. AUBREY HUSBAND, M.B., F.R.C.S., Lecturer on Public Health in the Edinburgh Medical School. Price 1s. 6d. cloth; 1s. paper.

Food. The Healthy Manufacture of Bread. By B. W. RICHARDSON, M.D., F.R.S. Price 6d. paper cover; cloth, 1s., with Vignette.

Foot. Movable Atlas of the Foot; its Bones, Muscles, etc. By Prof. WITKOWSKI. Price 7s. 6d. (See Anatomy.)

Forensic Medicine. The Maybrick Case. A Treatise by A. M. MACDOUGALL, B.A., LL.D. Price 10s. 6d.

Forensic Medicine. The Student's Handbook of Forensic Medicine and Public Health. By H. AUBREY HUSBAND, M.B., F.R.C.S.E. Sixth edition. Price 10s. 6d.

Forensic Medicine. Aids to Forensic Medicine and Toxicology. By W. DOUGLAS HEMMING, F.R.C.S.E., and H. AUBREY HUSBAND, M.B., F.R.C.S.E. Fifth thousand. Price 2s. 6d. cloth, 2s. paper.

Geology. Field Geology, with a Section on Palæontology. By W. HY. PENNING, F.G.S., of H.M. Geological Survey, and A. J. JUKES-BROWNE, B.A., F.G.S. With woodcuts and coloured map. Second edition, revised and enlarged. Price 7s. 6d.

"Others have taught us the principles of the science, but Mr. Penning, as an accomplished field-geologist, introduces us to the practice."—*The Academy.*

Geology. Engineering Geology. By the same Author. Illustrated with coloured maps and woodcuts. Price 3s. 6d.

"A full and lucid description of surveying and mapping, the diagnosing of the various minerals met with, the value of sites, rocks, etc."—*Popular Science Review.*

Geometry. Aids to Analytical Geometry. I. The Straight Line and Circle. By A. LE SUEUR, B.A. Cantab. Second edition, 2s.
II. The Conic Sections, with solutions of questions set at the London University and other Examinations by GEORGE HEPPEL, M.A. Cantab. Price 2s.

Gout. A Treatise on Gout. By AUSTIN MELDON, M.K.Q.C.P. F.R.C.S.I., Senior Surgeon Jervis Street Hospital, Consulting Physician Dublin General Infirmary. Tenth edition. Price 2s. 6d.

Gout. The Nature and Treatment of Gout. By Professor EBSTEIN of Gottingen University. Translated by J. E. BURTON, L.R.C.P. Lond. Price 3s. 6d.

Gymnastics. The Prevention and Cure of Many Chronic Diseases by Movements. By M. ROTH, M.D., F.R.C.S. Eng. With 90 engravings, price 5s.

Paralysis in Infancy, Childhood, and Youth, and on the Prevention and Treatment of Paralytic Deformities. Same Author. 3s. 6d.

The Prevention and Rational Treatment of Lateral Spine Curvature. (Gold Medal of the International Health Exhibition, 1884.) 200 engravings. Price 5s.

Gynæcology. Brandt's Treatment of Uterine Disease and Prolapsus by the Movement Cure. Edited and translated by Dr. ROTH. Price 5s.

Gynæcology. The Diseases of Women and their Treatment. By H. MACNAUGHTON JONES, M.D., F.R.C.S.I., F.R.C.S.E., Examiner in Midwifery, Royal College of Surgeons, Ireland. Fifth edition. Illustrated, price 10s. 6d.

"A storehouse of information."—*The Lancet.*
"The work of a mature and experienced authority."—*British Medical Journal.*
"Of exceptional merit drawn from a field of wide personal experience."—*Medical Press.*

Gynæcology. Aids to Gynæcology. By ALFRED S. GUBB, M.D. Paris, M.R.C.S., L.R.C.P., D.P.H., Obstetric Assistant and Gold Medallist Westminster Hospital. Second edition. Cloth, 2s. 6d., and 2s. sewn.

Hair. The Hair: its Growth, Care, Diseases, and Treatment. By C. H. LEONARD, M.A., M.D. Illustrated, price 7s. 6d.

Hair. A Synopsis of Diseases of the Skin and Hair. By R. GLASGOW-PATTESON, M.B., Surgeon to St. Vincent's Hospital. Price 1s.

Hand. Movable Atlas of the Hand; its Bones, Muscles and Attachments. By Prof. WITKOWSKI. Price 7s. 6d. (See Anatomy.)

Hay Fever: its Causes, Treatment, and Effective Prevention; Experimental Researches. By CHAS. HARRISON BLACKLEY, M.D. Second edition, revised and enlarged. Price 10s. 6d.

Heart. On Insufficiency of Aortic Valves in connection with Sudden Death. By JOHN COCKLE, A.M., M.D., F.R.C.P., Physician to the Royal Free Hospital. Second edition. Price 2s. 6d.

Heart. Contributions to Cardiac Pathology. By the same Author. Price 2s. 6d.

Heart. An Essay on Fatty Heart. By HENRY KENNEDY, A.B., M.B. Physician to the Whitworth Hospitals. Price 3s. 6d.

Heredity and Disease. From Generation to Generation. By DOUGLAS LITHGOW, LL.D., M.R.C.P., Lond. Price 4s. 6d.

Hernia and Intestinal Obstruction. By J. ROCHE, M.D. 6d.

Histology. Introduction to Practical Histology. By GEORGE THIN, M.D. Price 5s.

Histology. Methods of Preparing Brain, Spinal Cord, and Nerves for Microscopical Examination. By EDWIN GOODALL, M.D. Lond. [*In the Press.*

History of the Royal College of Surgeons in Ireland. By Sir C. A. CAMERON. Price 10s. 6d.

Hydrophobia. Inoculation for Rabies and Hydrophobia. A Study of the Literature of the subject. By Surgeon-General C. A. GORDON, C.B. Price 2s. 6d.

Hydrophobia. Comments on the Reports of the Committee on M. Pasteur's Treatment. By Surgeon-General C. A. GORDON, M.D., C.B. Price 2s. 6d.

Hydropathy, or the Practical Use of Cold Water. By E. MARLETT BODDY, F.R.C.S., F.S.S., L.R.C.P. Price 1s.

Hydropathy. Notes of Visits to Contrexéville and Royat-les-Bains. By F. R. CRUISE, M.D. Price 6d.

Hydropathy. Vichy and its Therapeutical Resources. By PROSSER JAMES, M.D., M.R.C.P. Lond., Lecturer on Materia Medica and Therapeutics at the London Hospital. Price 2s. 6d.

Hygiene. Lessons in Military Hygiene and Surgery, from the Franco-Prussian War. Prepared on behalf of Her Majesty's Government. By Surgeon-General GORDON, M.D., C.B., Hon. Physician to the Queen. Illustrated, price 10s. 6d.

Hygiene. A Manual of Sanitation; or, First Help in Sickness and when Wounded. Alphabetically arranged. By the same Author. Cloth, 2s. 6d.; sewn, 1s.

"A most useful and practical manual, and should be placed in the hands of officers and men alike."—*The Graphic.*

Hygiene. The Elements of School Hygiene for the Use of Teachers and Schools. By W. E. ROTH, B.A. Price 3s .6d.

Hygiene. Theatre Hygiene, a study in construction, safety and healthy arrangement. By W. E. ROTH, B.A. Oxon. Price 1s. 6d.

Hygiene. Healthy Homes. By STANLEY HAYNES, M.D., M.R.C.S., F.R.G.S. Price 1s.

Hygiene. Notes on Nuisances, Drains, and Dwellings. By W. H. PENNING, F.G.S. Second Edition. Price 6d.

Hygiene. Short Lectures on Sanitary Subjects. By RICHARD J. HALTON, L.K.Q.C.P., L.R.C.P. Ed., L.R.C.S.I., etc. Price 5s.

Hygiene. A Manual of Naval Hygiene, with Instructions and Hints on the Preservation of Health and the Prevention of Disease on board Ship. By JOSEPH WILSON, M.D. Second edition. 10s. 6d.

Hygiene. The Sanitation of Public Institutions. The Howard Prize Essay. By R. D. R. SWEETING, M.R.C.S., Medical Superintendent of the Western Fever Hospital. Price 3s. 6d.

Hypnotism. Psycho-Therapeutics. Treatment by Hypnotism and Suggestion. By J. LLOYD TUCKEY, M.D. Third Edition, enlarged. Price 6s.

Indigestion: a Manual of the Diagnosis and Modern Treatment of the Different Varieties of Dyspepsia. By GEORGE HERSCHELL, M.D. Lond. Crown 8vo., 202 pp., price 3s. 6d.

Inflammation. The State of the Blood and the Bloodvessels in Inflammation. By T. WHARTON JONES, F.R.C.S., F.R.S., Emeritus Professor of Ophthalmic Medicine and Surgery in University College, London. Price 2s. 6d.

"The work is that of a man of genius of the highest order."—Dr. RICHARDSON, F.R.S., in *Asclepiad.*

"A thoughtful study founded on the ripe experience of an author entitled to the highest respect."—*Medical Press.*

International Medical Congress. The Commemorative Portrait-Picture of the International Medical Congress, 1881. Designed and executed by Mr. BARRAUD; nearly 700 Likenesses of Members, representing Medicine and Surgery in every part of the world; special sittings accorded for every Portrait.

The Picture is Printed by the New Permanent Carbon Process in two Sizes:

EXTRA SIZE, 47 × 30, MOUNTED, BUT UNFRAMED	£7 10s.	FRAMED - £10 0s.
POPULAR SIZE, 29 × 20, MOUNTED, BUT UNFRAMED	£3 3s.	FRAMED - £4 10s.

Intestinal Surgery. (See Abdominal Surgery.)

Insanity. (See Lunacy.)

Kidneys. Vaso-Renal Change *versus* Bright's Disease. By J. MILNER FOTHERGILL, M.D. Ed. Price 7s. 6d.

Kidneys. Bright's Disease of the Kidneys. By Professor J. M. CHARCOT. Translated by H. B. MILLARD, M.D., A.M. Revised by the Author, with coloured plates, price 7s. 6d.

Lunacy. Handbook for the Instruction of Attendants on the Insane. Prepared by a Committee of the Medico-Psychological Association. With Appendix containing Lists of Asylums and Licensed Houses. Second edition. [*In Preparation.*

Materia Medica. A Dictionary of Materia Medica and Therapeutics. A Résumé of the Action and Doses of all Officinal and Non-officinal Drugs now in Common Use. By C. HENRI LEONARD, M.A., M.D., and THOS. CHRISTY, F.L.S., F.C.S. Price 6s. 1892.

This volume has been in preparation for the past four years. The drugs of as late introduction as 1891 are to be found in its pages. The authors claim to have incorporated everything of merit, whether officinal or non-officinal, that could be found either in standard works or from many manufacturers' catalogues. The scheme embraces the Pronunciation, Genitive case-ending, Common Name, Dose, and Metric Dose. Then the Synonyms, English, French, and German. *If a Plant* the Part Used, Habitat, Natural Order, and Description of Plant and Flowers, with its Alkaloids, if any. *If a Mineral*, its Chemical Symbol, Atomic Weight, looks, taste, and how found, and its peculiarities. Then the Action and Uses of the Drug, its Antagonists, Incompatibles, Synergists and Antidotes. Then follow its Officinal and Non-officinal preparations, with their Medium and Maximum Doses. Altogether it will be found a handy volume for either the Physician, Student, or Druggist, and will be frequently appealed to if in one's possession.

"Will, we are sure, fulfil a long-felt want."—*British and Colonial Druggist.*
"Well up to date. . . . Contains an index of great value."—*Chemist and Druggist.*

Materia Medica. Comprising the Drugs contained in the Schedule issued by the Conjoint Board of the Royal College of Physicians and Surgeons. Arranged by MAURICE WILLIAMS, Principal of the City School of Chemistry and Pharmacy. Price 3s. 6d.

Materia Medica. Table of Doses. By J. H. ALLAN, F.C.S. Price 6d., cloth.

Materia Medica. A Key to Organic Materia Medica. By JOHN MUTER, Ph.D., M.A., F.C.S., President of the Society of Public Analysts. Third edition. Price 12s. 6d.

Materia Medica. Aids to Materia Medica and Therapeutics. By C. E. ARMAND SEMPLE.

Part I.—The Non-metallic and Metallic Elements, Alcoholic and Ethereal Preparations, etc. Cloth, 2s. 6d.; paper, 2s.

Part II.—The Vegetable and Animal Substances. 2s. 6d., 2s.

Part III.—Classification of Remedies. Cloth, 1s. 6d.; paper, 1s.

Part IV.—New Remedies of the British Pharmacopœia. Cloth, 2s. 6d.; paper, 2s.

Part V.—Tablets of Materia Medica. Price, cloth, 1s. 6d.; paper, 1s.

Materia Medica and Pharmacy. A Text-Book for Medical and Pharmaceutical Students preparing for Examination. By W. HANDSEL GRIFFITHS, Ph.D., F.C.S., F.R.C.P. Ed. Third edition. Edited by A. S. GUBB, M.D. Paris, L.R.C.P. Lond., M.R.C.S., D.P.H., Gold Medallist, Prizeman in Materia Medica, Westminster Hospital. Price 7s. 6d.

"A book of great value . . . a standard text-book."—*Edin. Med. Journal.*
"One of the ablest, if not the best, work on the subject in our language."—*Med. Press.*

Materia Medica. Notes on Inorganic Materia Medica, and its Chemistry. By J. S. SHARMAN. Second edition. Price 1s. 6d.

Materia Medica. Notes on Materia Medica and Therapeutics. Mineral Drugs, Part I. By J. S. McArdle. Price 1s.

Medical Charities. The Reform of Our Voluntary Medical Charities. By Robert Reid Rentoul, M.D. Price 5s.

Medical Education. Medical Education and Organization. The Hunterian Oration for 1880. By Walter Rivington, B.A., M.B., F.R.C.S., Surgeon to the London Hospital. Price 1s.

Medical Etiquette. A Few Rules of Medical Etiquette. By a L.R.C.P. Lond. Price 1s.

Medical Jurisprudence. (See Forensic Medicine.)

Medical Laws. Medical Law for Medical Men: their Legal Relations popularly explained. By Professor Meymott Tidy, M.B., F.C.S., Barrister-at-Law, and Percy Clarke, LL.B., Solicitor. Leather, gilt edges, price 4s.

Medical Laws. The Laws Relating to Medical Men. By James Greenwood, Barrister-at-Law. Price 5s.

"Admirably suited as a guide to the busy practitioner, who frequently runs great risks of becoming involved in legal penalties, in consequence of an imperfect knowledge of the law."
—*Glasgow Medical Journal.*

Medical Profession. A Guide to the Medical Profession in all its branches, including the Public Services. By C. R. B. Keetley, F.R.C.S. Second edition, revised and enlarged. Price 3s. 6d.

Medical Profession. Medical Men and Manners of the Nineteenth Century. By a Physician. Third Thousand. Price 3s.

"At times scathing, at others amusing, the author is never dull, and writes as one who knows the many blots on our system, and honestly tries to remedy them."—*Medical Press.*

Medicine. Aids to Medicine. By C. E. Armand Semple, B.A., M.B. Cantab., M.R.C.P. Lond.

Part I.—General Diseases. Price 2s. 6d. and 2s.

Part II.—The Urine, Kidneys, Stomach, Peritoneum, Throat, and Œsophagus. Third Thousand. Price 2s. 6d. and 2s.

Part III.—Diseases of the Brain, Nervous System, and Spinal Cord. Third Thousand. Price 2s. 6d. and 2s.

Part IV.—Fevers, Skin Diseases. Price 2s. 6d. and 2s.

Medicine. A Chronology of Medicine from the Earliest Times. By J. Morgan Richards. Price 10s. 6d.

Medicine. Student's Handbook of the Practice of Medicine. By H. Aubrey Husband, M.B., C.M., B.Sc. Fourth edition, revised and enlarged. Illustrated. Price 7s. 6d.

Medico-Military Services. Our Services under the Crown. A Historical Sketch of the Army Medical Staff. By Surgeon-Major A. Gore, M.D., Sanitary Officer on the Staff. Price 6s.

Memory. Its Logical Relations and Cultivation. By F. W. EDRIDGE-GREEN, M.D., F.G.S., Author of "Colour Blindness." Second edition. Price 6s.

Meteorology. The Moon and the Weather: the Probability of Lunar Influence Reconsidered. Showing how storms and depressions may be predicted. By WALTER J. BROWNE (St. Petersburg). Second edition. Price 3s.

Microbes. (See Bacteriology.)

Microscopical Science. The International Journal of Microscopy and Natural Science. Edited for the Postal Microscopical Society by ALFRED ALLEN. Quarterly, with Plates. Price 1s. 6d.

Midwifery. (See Obstetrics.)

Mind. The Training of the Mind for the Study of Medicine. A Lecture delivered at St. George's Hospital. By ROBERT BRUDENELL CARTER, F.R.C.S., Surgeon to the Hospital. Price 1s.

"A remarkable address."—*The Lancet.*

"No one can read it without learning and profiting much."—*Students' Journal.*

Mineral Waters. The Mineral Waters of Europe. A complete Analytical Guide to all the Bottled Waters, and their Medicinal and Therapeutic Values. By Professor TICHBORNE, LL.D., F.C.S., President of the Pharmaceutical Society of Ireland, and M. PROSSER JAMES, M.R.C.P. Lond., Lecturer on Therapeutics, London Hospital. Price 3s. 6d.

"Such a book as this is simply invaluable."—*The World.*

Morals. A Physician's Sermon to Young Men. By WILLIAM PRATT, M.A., M.D., etc. Eighth thousand. Price 1s. cloth.

"The delicate topic is handled wisely, judiciously, and religiously, as well as very plainly."—*The Guardian.*

Morals. Revelations of Quacks and Quackery. With Facts and Cases in Illustration of their Nefarious Practices. By "DETECTOR." Thirtieth thousand. Price 2s.

Morphia. On the cure of the Morphia Habit. By OSCAR JENNINGS, M.D. Paris, F.R.C.S. Eng. Price 2s. 6d.

Nervous Diseases. Functional Nervous Diseases, their Causes and Treatment. By GEO. T. STEVENS, M.D., Ph.D. With plates. Price 12s.

Nervous Diseases. Clinical Notes on Nerve Disorders in Surgical Practice. By GEO. WHERRY, M.A., M.S. Cantab., F.R.C.S. Price 2s.

Nervous Diseases. (See also Brain.)

Nerve Supply. Atlas of Cutaneous Nerve Supply. By JACOB HEIBERG, M.D., and W. W. WAGSTAFFE, F.R.C.S. Containing 10 plates in colours. Price 4s. 6d.

Neuralgia. The Surgical Treatment of Neuralgia of the Fifth Nerve; being the Lettsomian Lectures for 1892. By Wm. Rose, M.B., B.S. Lond., F.R.C.S., Joint Professor of Surgery in King's College, London, and Surgeon to King's College Hospital. Illustrated. Price 3s. 6d.

Nose. (See Throat and Nose.)

Nursing. Questions and Answers on Nursing, for St. John's Ambulance Associations, Nursing Institutes, and Nurses generally. By John W. Martin, M.D., Author of "Ambulance Work." Fourth thousand. Price 1s. 6d. net.

Nursing. How to Feed an Infant. With an Appendix on the Common Ailments of Infancy, with their Hygienic and Curative Treatment. By Benson Baker, M.D. Price 1s. 6d.

Nursing. How to bring up Children by Hand. By J. Foster Palmer, L.R.C.P. Price 6d.

Nursing. Practical Guide for the Young Mother. From the French of Dr. Brochard, Director-General of Nurseries and Crèches, with Notes and Hints by a London Physician. Price 2s.

Obstetrics. Aids to Obstetrics. By Samuel Nall, M.B. Cantab., M.R.C.P. Lond., First Class Honours Nat. Sci. Cambridge, late Resident Obstetric Assistant, St. Bartholomew's Hospital. Twelfth thousand. Price 2s. 6d. cloth, 2s. paper wrapper.

Obstetrics. Hints for Midwives on Pregnancy and Labour. Abstracts of a Series of Lectures by H. Macnaughton Jones, M.D., M.C.H., F.R.C.S. Price 1s.

Obstetrics. The Diagnosis and Treatment of Extra-uterine Pregnancy. By John Strahan, M.D., M.Ch. (The Jenks Triennial Prize Essay awarded by the College of Physicians, 1889.) Price 4s. 6d.

Obstetrics. Hints for the Use of Midwives preparatory to their Examinations. By R. J. M. Coffin, F.R.C.P. Ed. Second Edition, enlarged. Price 2s.

Odontology. (See Dental.)

Old Age. The Diseases of Sedentary and Advanced Life. By J. Milner Fothergill, M.D., M.R.C.P. Lond. Price 7s. 6d.

Ophthalmology. (See Eye.)

Osteology. Osteology for Students, with Atlas of Plates. By ARTHUR TREHERN NORTON, F.R.C.S., Surgeon to, and Lecturer on Surgery at, St. Mary's Hospital. Atlas and Text in one volume, 7s. 6d.; in two volumes, 8s. 6d.

"The handiest and most complete handbook on Osteology."—*The Lancet.*

Osteology. Atlas of the Skeleton and its Articulations, showing the Bones and Ligaments of the Human Body and Limbs. By Professor WITKOWSKI. Price 7s. 6d. (See Anatomy.)

Overwork. Overwork and Premature Mental Decay: its Treatment. By C. H. F. ROUTH, M.D., M.R.C.P. Lond. Fourth edition. Price 2s. 6d.

Pathology. Handbook of Medical Pathology. By H. G. SUTTON, M.B., F.R.C.P. Lond., late Physician to, and Lecturer on Pathology at, the London Hospital. Price 5s.

"Such a work is to be accepted with gratitude for the thoughts it contains, and the facts on which they are based."—*The Lancet.*

Pathology. Aids to General Pathology. By GILBERT A. BANNATYNE, M.D. Cloth, price 1s. 6d.; sewn, 1s.

Pathology. Aids to Special Pathology. By the same Author Cloth, price 2s. 6d.; sewn, 2s.

Pathology of Tuberculosis. (See Consumption.)

Pathology. Handbook of Surgical Pathology. Edited by W. J. WALSHAM, M.B., F.R.C.S., and D'ARCY POWER, M.B. Oxon., F.R.C.S. Second edition. Price 9s.

"An embodiment of the most modern pathological teaching."—*The Lancet.*

Pathology. Examination Cards. Arranged as questions and answers for self-examination. By A. T. SCHOFIELD, M.D., M.R.C.S. Complete in two sets of cards, price 9d. net per set.

Mr. Jonathan Hutchinson, F.R.C.S., writes: "It is an invaluable means of self-tuition."

Peritonitis. Localised Peritonitis: its Etiology, Diagnosis, and Treatment. By JOHN WALLACE, M.D., Professor of Midwifery in the Victoria University. Illustrated. Price 1s.

Pharmacopœia. A Vest-Pocket Epitome of the British Pharmacopœia. By RUSSELL COOMBE, M.A., F.R.C.S. Cloth, price 1s.

Pharmacopœia. The Pocket Pharmacopœia. A Précis of the British Pharmacopœia, including the Therapeutical Action of the Drugs, their Natural Orders and Active Principles. By C. ARMAND SEMPLE, M.D., M.R.C.P. Second edition, with the Appendix of 1890. Price 3s. 6d.

Pharmacopœia. Notes on the Pharmacopœial Preparations for Pharmaceutical Students. By HANDSEL GRIFFITHS; revised by A. S. GUBB, M.D. Paris, L.R.C.P., M.R.C.S., D.P.H. Price 3s. 6d.

Pharmacy. Latin Grammar of Pharmacy, for the use of Students, with an Essay on Latin Prescriptions. By JOSEPH INCE, A.K.C.L., formerly Examiner and Member of Council, Pharmaceutical Society. Fifth edition. Price 5s.

Pharmacy. Aids to Pharmacy. By C. E. ARMAND SEMPLE, M.B. Cantab., M.R.C.P. Lond. Cloth, price 2s. 6d.; paper, 2s.

Phimosis. Its Causes, Symptoms, and Treatment; with a description of the ancient rite of circumcision. By L. H. ORMSBY, M.D., F.R.C.S.I., Lecturer on Clinical and Operative Surgery at, and Surgeon to, the Children's Hospital, Dublin. Price 1s.

Physics. A Manual of Physics. Being an Introduction to the Study of Physical Science designed for University Students. By W. PEDDIE, D.Sc., F.R.S.E., Lecturer on Physics in the University of Edinburgh. (*University Series of Manuals.*) Price 7s. 6d.

"Altogether worthy of praise. . . . We have no hesitation in giving it high commendation. . . . We wish it all success, feeling well satisfied that it meets a decided want."—*Nature.*

Physiological Chemistry. Aids to Physiological Chemistry. By J. L. THUDICHUM, M.D., F.R.C.P. Lond., St. Thomas's Hospital. Cloth, price 2s. 6d. Wrapper, 2s.

Physiological Factor in Diagnosis. By J. MILNER FOTHERGILL, M.D., M.R.C.P. Lond., Physician to the City of London Hospital for Diseases of the Chest. Second edition. Price 7s. 6d.

Physiological Laboratory. Manual for the Physiological Laboratory. By VINCENT D. HARRIS, M.D., F.R.C.P., Examiner in Physiology, the Royal College of Physicians of London, and D'ARCY POWER, M.B. Oxon., Curator of Museum, St. Bartholomew's Hospital. Fifth edition. Price 7s. 6d.

"This manual is already well and favourably known, and the new edition contains many valuable additions."—*Lancet.*

Physiology. A Manual of Physiology. By G. N. STEWART, M.A., D.Sc. University of Cambridge. (*University Series of Manuals.*) [*In the Press.*

Physiology. The Physiologist in the Household. By J. MILNER FOTHERGILL, M.D., M.R.C.P. Part I.—Adolescence. Price 1s.

Physiology. Aids to Physiology. By B. THOMPSON LOWNE, F.R.C.S., Arris and Gale Lecturer, and Examiner in Physiology, Royal College of Surgeons of England. Fourth thousand, illustrated. In two parts, 2s. each, or in one vol., cloth, 4s. 6d.

"As 'aids' and not substitutes, they will prove of real value to students."—*Medical Press.*
"Certainly one of the best of the now popular 'Aid Series.'"—*Students' Journal.*

Plant Analysis. (See Chemistry.)

Polypus in the Nose and other Affections of the Nasal Cavity; their successful treatment. By J. L. W. THUDICHUM, M.D., F.R.C.P. Lond. Sixth edition. Price 1s.

Population. On the Evils, Moral and Physical, likely to follow, if practices, intended to act as checks to population, be not strongly discouraged and condemned. By C. H. F. ROUTH, M.D., F.R.C.P. Second thousand. Price 1s.

Posology. Posological Tables: a Classified Chart, showing at a glance the Dose of every Officinal Substance and Preparation. By HANDSEL GRIFFITHS, Ph.D., L.R.C.P. Fifth edition, revised by PETER W. SQUIRE, F.L.S., F.C.S. Price 1s.; or mounted on linen, rollers, and varnished, 3s. 6d.

Pregnancy. (See Obstetrics.)

Prescriptions. The Student's Pocket Prescriber. By H. AUBREY HUSBAND, M.B., F.R.C.S.E. Price 1s. cloth.

Psychological Medicine in John Hunter's Time and the Progress it has made. By FLETCHER BEACH, M.B., F.R.C.P. Price 1s.

Psycho-Therapeutics. (See Hypnotism.)

Public Health. Aids to Sanitary Science, for the Use of Candidates for Public Health Qualifications. By F. J. ALLAN, M.D., Dipl. Public Health, Camb., Assistant Professor of Hygiene, College of State Medicine. 236 pp., price 4s. 6d. cloth.

"A really admirable synopsis of what it is most necessary for a candidate to know."—*Glasgow Medical Journal.*

"The information contained is correct, well expressed and well arranged."—*Public Health.*

"The work has been well done. . . . Will be found a serviceable and reliable aid."—*Edinburgh Medical Journal.*

Public Health. The Practical Guide to the Public Health Acts and Correlated Acts for Officers of Health and Inspectors of Nuisances. By THOS. WHITESIDE HIME, B.A., M.B. Second edition, enlarged. [*In the Press.*

Public Health. Aids to Public Health. By J. L. THUDICHUM, M.D., F.R.C.P. Lond. Price 1s. 6d. cloth; 1s. paper wrapper.

Public Health. Guide to Sanitary Science Examinations. By HERBERT JONES, D.P.H. Cantab. Price 2s. 6d.

Pulse. How to feel the Pulse and what to Feel in it. Practical Hints for Beginners. By WILLIAM EWART, M.D., F.R.C.P. Lond., Physician to St. George's Hospital. With a glossary and twelve illustrations. Price 3s. 6d.

Pulse. The Sphygmograph: its History and use as an aid to Diagnosis. By R. E. DUDGEON, M.D. Price 2s. 6d.

Rabies. (See Hydrophobia.)

Rheumatism. Its Treatment by Electric Massage, etc., in connection with the Wiesbaden Thermal Waters. By CARL MORDHORST, M.D. Kiel. Price 1s.

Rupture of the Perineum. Its Causes, Prevention and Treatment. By MICHAEL JOSEPH MOLONY, M.R.C.P., L.R.C.S. Price 2s. cloth, 1s. 6d. paper.

Salt. History of Salt, with Observations on its Medicinal and Dietetic Properties. By EVAN MARLETT BODDY, F.R.C.S., F.S.S., L.R.C.P. Price 2s. 6d.

Sea-Sickness. Sea-Sickness, Cause, Prevention and Cure. Voyaging for Health, with an Appendix on Ship-Surgeons. By THOMAS DUTTON, M.D. Second edition, price 1s. 6d.

Sewage. The Sewage Question: Reports upon the Principal Sewage Farms and Works of the Kingdom, with Notes and Chemical Analyses. By the late Dr. LETHEBY. Price 4s. 6d.

Skin Diseases of Infancy and Early Life. By C. M. CAMPBELL, M.D., C.M. Edin. Price 5s.

Skin. A Synopsis of Diseases of the Skin and Hair. By R. GLASGOW PATTESON, M.B., Surgeon to St. Vincent's Hospital. Price 1s.

Skin. Dermic Memoranda: An Introduction to the Study of Skin Disease, with Special Reference to the Exanthemata. By WILLIAM GEMMEL, M.B., Resident Medical Officer, Glasgow Fever Hospital. Price 3s. net.

Skin. Scabies: its Causation, Diagnosis, and Treatment. By ARTHUR HARRIES, M.D. Price 6d.

Skin. Lupus. A Pathological and Clinical Investigation. By ARTHUR HARRIES, M.D., and C. M. CAMPBELL, M.D. Price 1s.

Skin. Some Diseases of the Skin produced by Derangements of the Nervous System. By T. STRETCH DOWSE, M.D., F.R.C.P.E. Price 2s.

Stomach. The Surgical Diseases and Injuries of the Stomach and Intestines. By F. BOWREMAN JESSETT, F.R.C.S., Surgeon to the Cancer Hospital. Numerous engravings. Price 7s. 6d.

Stricture. Stricture of the Urethra: its Diagnosis and Treatment. By E. DISTIN MADDICK, F.R.C.S. Edin., late Surgeon R.N. 4s.

Surgery. The Science and Practice of Surgery, a Complete Text-book. By F. J. GANT, F.R.C.S., Senior Surgeon Royal Free Hospital. Third edition, with nearly 1,100 engravings. 2 vols., price 36s.

"The entire work has been revised to present the modern aspects of Surgery."—*Lancet.*
"Does credit to the author's thorough surgical knowledge."—*British Medical Journal.*

Surgery. The Student's Surgery : a Multum in Parvo. By F. J. GANT, F.R.C.S. 850 pp., illustrated. Price 10s. 6d.

"It well fulfils the object for which it is written."—*Lancet.*
"From the student's point of view it is a necessity."—*British Medical Journal.*

Surgery. The Rules of Aseptic and Antiseptic Surgery, for the use of Students and General Practitioners, with 248 engravings and 3 chromo-lithographic plates. By A. G. GERSTER, M.D., Professor of Surgery at the New York Polyclinic. Price 15s.

Surgery. Operative Surgery on the Cadaver. By JASPER J. GARMANY, A.M., M.D., F.R.C.S. Price 8s. 6d.

Surgery. Aids to Surgery. By GEORGE BROWN, M.R.C.S. 2 parts, price 1s. 6d. cloth, and 1s. sewn, each ; or in 1 vol., 2s. 6d.

Surgery. The Text-book of Operative Surgery. With 88 beautifully engraved steel plates, after BERNARD and HUETTE. Text by ARTHUR TREHERN NORTON, F.R.C.S., Surgeon to, and Lecturer on Surgery at, St. Mary's Hospital. Second edition, half calf, plain, 25s. ; hand-coloured, 50s.

"Of the highest merit as a guide to operative surgery."—*Students' Journal.*

Surgery. Annals of Surgery. A monthly Review of Surgical Science and Practice, published simultaneously in America and London. Edited by L. S. PILCHER, M.D., and FREDERICK TREVES, F.R.C.S. Eng. Price 2s., or 21s. per annum post free.

Surgery. The Anatomy of Surgery. By JOHN MCLACHLAN, M.B., M.R.C.S. With 74 illustrations. Two vols., price 18s.

Surgery. The Surgery of the Knee-Joint, and the Responsibility placed on the Physician and General Practitioner by the Modern Process of Surgery. By C. B. KEETLEY, F.R.C.S., Senior Surgeon to the West London Hospital, and Surgeon to its Orthopædic Department. Cloth, price 1s. 6d.

Surgery, Minor—and Bandaging. Questions and Answers for Self-examination. By A. T. SCHOFIELD, M.D. Price 9d. net.

Surgical Pathology. Handbook of Surgical Pathology. By W. J. WALSHAM, M.B., F.R.C.S., and D'ARCY POWER, M.B., F.R.C.S. Second edition. Price 9s.

"An embodiment of the most modern pathological teaching."—*The Lancet.*

Surgical Anatomy. (See Surgery.)

Surgical Treatment. Notes on Surgical Treatment and Minor Operations. Designed especially for House Surgeons and Students. By T. F. Hopgood, L.R.C.P., M.R.C.S. Surgeon to the Sunderland Infirmary. Price 2s. 6d.

Syphilis. Tables for the Diagnosis and treatment of Syphilis. By J. K. Barton, M.D., F.R.C.S.I. Third edition. Price 1s. 6d. net.

Syphilis. The Nature and Treatment of Syphilis, and the other so-called Contagious Diseases. By C. R. Drysdale, M.D., M.R.C.P. Lond., F.R.C.S. Eng. Fifth edition. Price 5s.

Temperature Charts for Recording the Range of Temperature, Pulse, Respiration, History, Progress, and Treatment of Cases. By E. W. Moore, M.D., M.R.C.P. Price 1d. each, 9d. per dozen; or mounted, similar to a blotting-pad, 50, 3s. 6d.; 100, 7s.

Theories of Life. The Protoplasmic Theory of Life. By John Drysdale, M.D., F.R.M.S. Price 5s.

Theories of Life. How to Prolong Life. Showing the Diet and Agents best adapted for a lengthened prolongation of existence. By C. W. De Lacy Evans, M.R.C.S. Second edition. Price 5s.

"A good account of the changes which occur with the advance of age."—*Lancet.*

Therapeutics. Modern Therapeutics, Medical and Surgical, including the Diseases of Women and Children. By Geo. H. Napheys, A.M., M.D. Ninth edition. Revised and enlarged by Drs. Allen Smith and Aubrey Davis. Vol. I.—Medical. Price £1 10s. [*In the Press.*

Therapeutics. The Therapeutics of the Respiratory Passages. By Prosser James, M.D., Lecturer on Materia Medica and Therapeutics at the London Hospital. Price 10s. 6d.

"Dr. Prosser James has produced a scholarly treatise."—*New York Medical Record.*

Therapeutics. Aids to Rational Therapeutics, for the guidance of Practitioners and Senior Students. By J. Milner Fothergill, M.D. Second edition. Price 2s. 6d. cloth; 2s. paper wrapper.

Throat. Movable Atlas of the Throat, and the Mechanism of Voice, Speech and Taste. By Prof. Witkowski. (See Anatomy.)

Throat. Diseases of the Throat and Nose. A Practical Guide to Diagnosis and Treatment. With 220 typical illustrations in chromo lithography and numerous wood engravings. By Lennox Browne, F.R.C.S. Edin., Senior Surgeon to the Central London Throat and Ear Hospital. Fourth edition. [*In the Press.*

"One of the completest treatises on diseases of the throat in any language."—*British Medical Journal.*

"The best text-book in the English language."—*Edinburgh Medical Journal.*

Throat. Affections of the Throat and Larynx. By ARTHUR TREHERN NORTON, F.R.C.S., Surgeon to St. Mary's Hospital. Second edition, illustrated. Price 6s.

"Short, simple, and thoroughly practical instruction."—*Medical Press.*

Throat. Laryngoscopy and Rhinoscopy: in the Diagnosis and Treatment of Diseases of the Throat and Nose. With hand-coloured plates and woodcuts. By PROSSER JAMES, M.D., M.R.C.P. Fifth edition. Price 6s. 6d.

Throat. Tonsillitis in Adolescents. By C. HAIG-BROWN, M.D. C.M., Medical Officer to the Charterhouse. Price 3s.

Transfusion. On Transfusion of Blood and Saline Fluids. By C. EGERTON JENNINGS, F.R.C.S. Third edition, with Preface by SIR SPENCER WELLS, Bart. Price 4s. 6d.

Tuberculosis. (See Consumption.)

Urinary Diseases. Diseases of the Bladder, Prostate Gland, and Urethra. By F. J. GANT, F.R.C.S., Senior Surgeon to the Royal Free Hospital. Fifth edition, enlarged. Price 12s. 6d.

"The work throughout bears evidence of having been written by a thoroughly practical and experienced surgeon."—*Lancet.*

Urine. The Urine in Health and Disease, its Chemical Examination, etc. By H. AUBREY HUSBAND, M.B., B.Sc., F.R.C.S. Second edition. Price 1s. net.

Urine. The Urine; a Guide to its Practical Examination. By J. TYSON, M.D., Professor of Morbid Anatomy in the University, and President of the Pathological Society of Philadelphia. Fifth edition, with numerous illustrations. Price 7s. 6d.

"We think it the most practically useful guide we have on the subject."—*Medical Record.*

Vichy. Vichy and its Therapeutical Resources. By PROSSER JAMES, M.D., M.R.C.P. Lond., Lecturer on Materia Medica and Therapeutics at the London Hospital. Price 2s. 6d.

Voice. The Philosophy of Voice. Showing the right and wrong Action of the Breath and Vocal Cords in Speech and Song. By CHARLES LUNN. Sixth edition. Price 3s.

Voice. Artistic Voice in Speech and Song. Dedicated to Mr. Sims Reeves and Mr. Santley. By the same Author. 1s.

Voice. The Voice Musically and Medically Considered. By C. ARMAND SEMPLE, M.B. Cantab., M.R.C.P. Lond., Physician to the Royal Society of Musicians. Part I. Musical, price 1s.; Part II., Medical, price 2s.; or in one vol., cloth, 3s. 6d.

Whooping-Cough. Its Pathology and Treatment. Fothergillian Prize Essay. By THOS. M. DOLAN, M.D., F.R.C.S.E. Price 3s. 6d.

Zoology and Comparative Anatomy, Aids to. By MAJOR GREENWOOD, M.D., Honours. Price 2s. 6d., and 2s.

THE STUDENTS' AIDS SERIES.

Specially designed to assist Students in committing to memory and grouping the subjects upon which they are to be examined.

Aids to Analysis of Food and Drugs. By H. Aubrey Husband, M.B., F.R.C.S. Price 1s. 6d. cloth ; 1s. paper.

Aids to Anatomy. By George Brown, M.R.C.S., Gold Medallist, Charing Cross Hospital. Price 1s. 6d. cloth ; 1s. paper

Aids to Botany. By C. E. Armand Semple, B.A., M.B. Cantab., M.R.C.P. Lond., late Senior Examiner in Arts at Apothecaries' Hall. Third thousand. Price 2s. 6d. cloth ; 2s. paper wrapper.

Aids to Chemistry. By the same Author.
Part I.—Inorganic: Non-Metallic Substances. 2s. 6d. and 2s.
Part II.—Inorganic: The Metals. 2s. 6d. cloth ; 2s. paper.
Part III.—Organic. Price, cloth 2s. 6d.; paper 2s.
Part IV.—Tablets of Chemical Analysis. 1s. 6d., 1s.

Aids to Practical Chemistry. Especially arranged for the Analysis of Substances containing a Single Base and Acid Radicle. By T. Hurd Gordon. Price 2s. 6d. cloth; 2s. paper.

Aids to Dental Surgery. By Arthur S. Underwood, M.B., M.R.C.S., Lecturer on Dental Surgery at the Dental Hospital of London. Price 2s. 6d. cloth ; paper wrapper 2s.

Aids to Dental Histology. By the same Author. Illustrated. Price 2s. 6d. cloth ; 2s. paper wrapper. 1892.

Aids to Diagnosis. Part I.—Semeiological. By J. Milner Fothergill, M.D., M.R.C.P. Lond. Price 1s. 6d. cloth ; 1s. paper.
Part II.—Physical. By J. C. Thorowgood, M.D., F.R.C.P. Lond. Price 1s. 6d. cloth ; 1s. paper wrapper.
Part III.—What to Ask the Patient. By J. Milner Fothergill, M.D., M.R.C.P. Lond. Price 1s. 6d. cloth ; 1s. paper. The three in one vol., 3s. 6d.
"A mine of valuable information."—*Edinburgh Medical Journal.*

Aids to Examinations. Being Questions and Answers on Materia Medica, Medicine, Midwifery, Pathology, etc. By W. Douglas Hemming, F.R.C.S., and H. Aubrey Husband, M.B., F.R.C.S. Third thousand. Price 1s. 6d. cloth ; and 1s. paper.

Aids to Forensic Medicine and Toxicology. By W. D. Hemming, F.R.C.S.E., and H. Aubrey Husband, M.B., F.R.C.S.E. Third thousand. Price 2s. 6d. and 2s.

Aids to Gynæcology. By Alfred Gubb, M.D. Paris, M.R.C.S., L.R.C.P., D.P.H., Obstetric Assistant and Gold Medallist, Westminster Hospital. Cloth, price 2s. 6d. ; sewn, 2s.

Aids to Materia Medica and Therapeutics. By C. E. Armand Semple, B.A., M.B. Cantab., M.R.C.P. Lond.

Part I.—The Non-Metallic and Metallic Elements, Alcoholic and Ethereal Preparations. 2s. 6d. cloth ; and 2s. paper.
Part II.—Vegetable and Animal Substances, 2s. 6d. and 2s.
Part III.—Classification of Remedies, 1s. 6d. and 1s.
Part IV.—New Remedies. 2s. 6d. and 2s.
Part V.—Tablets of Materia Medica. Price 1s. 6d. and 1s.

Aids to Medicine. By the same Author.
Part I.—General Diseases. Lungs, Heart, and Liver. Price 2s. 6d. and 2s.
Part II.—The Urine, Kidneys, etc. 2s. 6d. and 2s.
Part III.—The Brain and Nervous System. 2s. 6d. and 2s.
Part IV.— The Fevers, Skin Diseases, etc. Price 2s. 6d. and 2s.

Aids to Obstetrics. By Samuel Nall, B.A., M.B. Cantab., M.R.C.P. Lond., late House Physician and Resident Obstetric Assistant, St. Bartholomew's Hospital. Twelfth thousand. Price 2s. 6d. and 2s.

Aids to Ophthalmic Medicine and Surgery. By Jonathan Hutchinson, jun., F.R.C.S. Cloth, 2s. 6d. ; sewn, 2s.

Aids to General Pathology. By Gilbert A. Bannatyne, M.D. Cloth, 1s. 6d.; sewn, 1s.

Aids to Special Pathology. By the same Author. Cloth, 2s. 6d.; sewn, 2s.

Aids to Pharmacy. By C. E. Armand Semple, B.A., M.B. Cantab., M.R.C.P. London. Cloth, price 2s. 6d. ; paper wrapper, 2s.

Aids to Physiology. By B. Thompson Lowne, F.R.C.S., Examiner in Physiology, Royal College of Surgeons. Fourth thousand. In two parts, price 2s. each ; or in one vol., cloth, 4s. 6d.

"Certainly one of the best of the now popular Aids Series."—*Students' Journal.*

Aids to Practical Physiology. By J. Brindley James, M.R.C.S. Price 1s. 6d. cloth ; 1s. paper.

Aids to Physiological Chemistry. By J. L. Thudichum, M.D., F.R.C.P. Lond., formerly Lecturer on Physiological Chemistry, St. Thomas's Hospital. Price 2s. 6d. and 2s.

Aids to Psychological Medicine. By L. S. Forbes Winslow, M.B., D.C.L. Oxon. Price 1s. 6d. and 1s.

Aids to Public Health. By J. L. THUDICHUM, M.D., F.R.C.P. Lond. Price 1s. 6d. cloth, 1s. paper.

Aids to Sanitary Science for the Use of Candidates for Public Health Qualifications. By F. J. ALLAN, M.D., Assistant Professor of Hygiene, Coll. State Medicine. 236 pp. Price, cloth, 4s. 6d.; or in two parts, sewn, 2s. each.

Aids to Surgery. In two parts. By GEORGE BROWN, M.R.C.S. Price 1s. 6d. cloth, and 1s. paper, each; or in one vol., cloth, 2s. 6d.

Aids to Rational Therapeutics. By J. MILNER FOTHERGILL, M.D., M.R.C.P. Lond. Price 2s. 6d. and 2s.

Replies to Questions in Therapeutics. By BRINDLEY JAMES, M.R.C.S. Price 1s. 6d. cloth, 1s. paper wrappers.

Aids to Zoology. By MAJOR GREENWOOD, M.D. Honours in Zoology, University of London. Price 2s. 6d. and 2s.

Aids to Analytical Geometry.

The Straight Line and Circle. By A. LE SUEUR, B.A. Cantab. Second edition. Price 2s.

The Conic Sections, with solutions of questions set at the London and other University Examinations. By GEORGE HEPPEL, M.A., St. John's College, Cambridge, Member of London Mathematical Society. Price 2s.

WORKS
ON
VETERINARY MEDICINE AND SURGERY.

Amateur. Horses: their Rational Treatment and the Causes of their Premature Decay. By AMATEUR. Price 5s.

——— An Abridgment of the above. By the same Author. Price 1s.

Banham. Tables of Veterinary Posology and Therapeutics. With Weights, Measures, etc. By Professor GEORGE A. BANHAM, F.R.C.V.S. Price 2s. 6d.

Beacock. Prize Essay on the Breeding, Rearing, and Fattening of Cattle and Sheep, and proper treatment of Cows at time of Calving. By JOSEPH BEACOCK. Price 3d.

Burke. The Tropical Diseases of the Horse. By Captain R. W. BURKE, M.R.C.V.S., A.V.D. Third edition. [*In the Press.*

Burness—Mavor. The Specific Action of Drugs, an Index to their Therapeutic Value. By A. G. BURNESS and F. MAVOR, President of the Central London Veterinary Society. Price 10s. 6d.

Courtenay. The Practice of Veterinary Medicine and Surgery. By E. COURTENAY. Price 10s. 6d.

"Written in a clear and concise style: will form a welcome addition to the library of the horse-owner, and those who take an interest in domesticated animals generally."—*Mark Lane Express.*

Fleming. A Text-Book of Veterinary Obstetrics, including the diseases and accidents incidental to pregnancy, parturition and early age in the Domesticated Animals. By GEORGE FLEMING, C.B., LL.D., F.R.C.V.S., F.R.G.S., President of the Royal College of Veterinary Surgeons, late Principal of the Army Veterinary Department. Profusely illustrated. Cloth, price 30s.

"Has filled up a void in a more satisfactory and complete way than any other member of his profession could have done."—*The Field.*
"No man who makes any pretensions to veterinary science or stock breeding can dispense with this work."—*Live Stock Journal.*

Fleming. Parasites and Parasitic Diseases of the Domesticated Animals. A Treatise by L. G. NEUMANN, Professor at the National Veterinary School of Toulouse. Translated and Edited by GEO. FLEMING, C.B., LL.D., F.R.C.V.S., with 365 illustrations. Price 25s.

"Cannot fail to be of immense value to both the veterinary profession and to British stock-breeders."—*Bell's Weekly Messenger.*

Fleming. A Text-Book of Operative Veterinary Surgery. Part I., price 10s. 6d. Part II. [*In the Press.*

——— The Contagious Diseases of Animals: their influence on the wealth and health of the nation. Price 6d.

——— Animal Plagues; their History from the Earliest Times, Nature, and Prevention. Vol. I., to 1800. Price 15s.

——— Vol. II., from A.D. 1800 to 1844. Price 12s.

——— Actinomykosis. An Infectious Disease of Animals and Mankind. Price 1s.

——— On Roaring in Horses (**Laryngismus Paralyticus**). Its History, Pathology, and Treatment. With coloured plate and woodcuts. Price 6s.

——— Tuberculosis from a Sanitary and Pathological point of view. Price 1s.

——— Human and Animal Variolæ. A Study of Comparative Pathology. Price 1s.

——— Practical Horse Shoeing. With 37 illustrations. 2s.

——— The Influence of Heredity and Contagion on the Propagation of Tuberculosis. By G. FLEMING, F.R.C.V.S., HERR A. LYDTIN, and M. VAN HERTSEN. Price 6s.

Gresswell. A Manual of the Theory and Practice of Equine Medicine. By J. BRODIE GRESSWELL, F.R.C.V.S., and ALBERT GRESSWELL, M.R.C.S. Eng. Second edition, enlarged. Price 10s. 6d.

BY THE SAME AUTHORS.

Equine Hospital Prescriber. Second edition. Price 2s. 6d.

Bovine Prescriber. Price 2s. 6d.

Veterinary Pharmacopœia. Materia Medica and Therapeutics. Price 10s. 6d.

Diseases and Disorders of the Horse. A Treatise on Equine Medicine and Surgery. Price 5s.

Hill. Principles and Practice of Bovine Medicine and Surgery, with woodcuts and coloured plates. By J. WOODROFFE HILL, F.R.C.V.S. Price 36s.

———The Management and Diseases of the Dog. By J. W. HILL, F.R.C.V.S. Third edition. Illustrated. Price 7s. 6d.

Lambert. The Germ Theory of Disease, Concisely and Simply Explained. By Colonel JAMES LAMBERT, F.R.C.V.S., Army Veterinary Department. Price 1s.

Liautard. Animal Castration. By A. LIAUTARD, M.D., H.F.R.C.V.S. Price 7s. 6d.

——— Lameness of Horses and Diseases of the Locomotor Apparatus. Price 10s. 6d.

Lupton. The Horse: its Examination and Law of Warranty. By JAMES IRVINE LUPTON, F.R.C.V.S. [*In the Press.*

Miller—Tellor. The Diseases of Live Stock, and their most efficient remedies. A Popular Guide for the Medical and Surgical Treatment of all Domestic Animals, including Horses, Cattle, Cows, Sheep, Swine, Fowls, Dogs, etc. By Wm. B. E. Miller, D.V.S., President of U.S. Veterinary Association, Willis P. Hazard, A. Liautard, M.D., F.R.C.V.S., and Lloyd V. Tellor, M.D. Price 10s. 6d.

McBride. Anatomical Outlines of the Horse. By J. A. McBride, Ph.D., M.R.C.V.S. Third edition. Illustrated. Price 8s. 6d.

Meyrick. Stable Management and the Prevention of Diseases among Horses in India. By J. J. Meyrick, C.B., A.V.D., F.R.C.V.S., Principal Army Veterinary Surgeon in Egypt. Formerly Superintendent of Horse Breeding for the Punjab. 2s. 6d.

Neumann's Parasites and Parasitic Diseases of the Domesticated Animals. (See Fleming.)

Poyser. The Stable Management of Troop Horses in India. "The Collinsian" Prize Essay. By Major R. Poyser, A.V.D., F.R.C.V.S. Price 2s.

Reynolds. The Breeding, Rearing, and Management of Draught Horses. By Richard Reynolds, M.R.C.V.S. Price 3s. 6d.

Robertson. A Handbook of the Practice of Equine Medicine. By Wm. Robertson, F.R.C.V.S., late Principal of the Royal Veterinary College, London. Second edition. Price 25s.

Smith. A Manual of Veterinary Hygiene. By Captain Frederick Smith, A.V.D., M.R.C.V.S., Lecturer on Veterinary Hygiene in the Army Medical School, Aldershot. Price 10s. 6d.

——— A Text-Book of Veterinary Physiology. By the same Author. [*In the Press.*

Veterinary Diagrams in Tabular Form. With coloured and plain engravings. Size of sheet 28½ by 22 inches.

No. 1.—The External Form and Elementary Anatomy of the Horse. Price 3s. 6d., or mounted on roller and varnished, 6s. 6d.

No. 2.—The Age of Domestic Animals. Price 2s. 6d., or mounted on roller and varnished, 5s. 6d.

No. 3.—The Unsoundnesses and Defects of the Horse. Price 2s. 6d., or mounted on roller and varnished, 5s. 6d.

No. 4.—The Shoeing of the Horse, Mule and Ox. Price 2s. 6d., or mounted on roller and varnished, 5s. 6d.

No. 5.—The Elementary Anatomy, Points and Butcher's Joints of the Ox. Price 3s. 6d., or mounted, 6s. 6d.

Price per set of Five, 12s.; or mounted, 27s.

PERIODICAL PUBLICATIONS.

The Medical Press and Circular. Established 1838. Published every Wednesday in London, Dublin, and Edinburgh. Price 5d.; £1 1s. per annum, post free, in advance.

The Hospital Gazette (and Students' Journal). A Weekly Review of Medicine, Surgery, and the Collateral Sciences. The only Paper that represents the whole body of Medical Students. Price 2d.; 8s. per annum, prepaid.

Journal of the British Dental Association. A Monthly Review of Dental Surgery. Published on the 15th of each month. Price 6d., or 7s. per annum, post free.

Annals of Surgery. A Monthly Review of Surgical Science and Practice, published simultaneously in Philadelphia and London. Price 2s. monthly, or 21s. per annum, post free.

The Australasian Medical Gazette. Monthly, 2s., or yearly post free, price 21s.

The Analyst. The Official Organ of "The Society of Public Analysts." Monthly, price 6d.; 6s. per annum, paid in advance.

The Veterinary Journal, and Annals of Comparative Pathology. Monthly, price 1s. 6d.; 18s. per annum; Postal Union 19s. 6d., prepaid.

International Journal of Microscopy and Natural Science. Edited by Mr. ALFRED ALLEN. Price 1s. 6d. Quarterly.

Transactions of the Royal Academy of Medicine in Ireland. Annual volumes, 14s.

Foreign postage extra.

DIRECTORIES.

The Official Register of the Royal College of Veterinary Surgeons; published in accordance with the Act of Parliament. Price 2s., post free in the United Kingdom.

Commercial Directory for Spain, its Colonies and Dependencies, containing 500,000 Names and Addresses of the Commercial Houses, Public Officers, Offices, etc., etc. Annual, price 20s. net.

RD 662
892 J

RD662
S92J

Date Issued

TRANSFERRED TO
YALE MEDICAL LIBRARY

TRANSFERRED TO
YALE MEDICAL LIBRARY